

A REVISION OF THE TYPE SPECIMENS OF TERTIARY MOLLUSCS FROM CHILE AND ARGENTINA DESCRIBED BY D'ORBIGNY (1842), SOWERBY (1846) AND HUPÉ (1854)

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SYNOPSIS The 122 Cenozoic molluscan species from Chile and Argentina introduced by d'Orbigny (1842), Sowerby (1846) and Hupé (1854) are all based on material collected during early expeditions to that part of the world during the nineteenth century. These species are revised herein and many are assigned to appropriate modern genera. A brief list of synonyms is given, stating only those references – in addition to the original one – in which material is illustrated or new combinations provided. Comments on the nature and preservation of the type material and on the status of the taxa are provided in order to clarify nomenclatural and taxonomic confusion that has arisen over the years because of the poor understanding of the types. Most of the type material is re-illustrated. Necessary lectotypes are designated for the following: *Pecten centralis* Sowerby, 1846, *Venus meridionalis* Sowerby, 1846, *Venus munsterii* d'Orbigny, 1842, *Ostrea patagonica* d'Orbigny, 1842, *Fusus cleryanus* d'Orbigny, 1842, *Trochus collaris* Sowerby, 1846, *Turritella patagonica* Sowerby, 1846 and *Scalaria rugulosa* Sowerby, 1846. Neotypes are designated for *Venus petitiana* d'Orbigny, 1842 and *Pleurotoma lanceolata* Hupé, 1854. Two new names are provided to remove homonymy: *Inquisitor lingulacanthinus* for *Pleurotoma lanceolata* Hupé, 1854 *non* Reeve, 1845 and *Palaeomelon jeffi* for *Voluta triplicata* Sowerby, 1846 *non* Donovan, 1802. Whenever possible, type localities are as closely circumscribed as permitted by the data provided in the original references, later references by other authors, evidence drawn from the type material itself and personal survey of the putative localities. Entries are organised alphabetically under the original specific name. They are separated taxonomically into bivalves, gastropods and scaphopods.

KEY WORDS Bivalvia, Cainozoic, Gastropoda, Scaphopoda, South America, taxonomy

Contents

Introduction	254
Material	255
The d'Orbigny Collection	255
The Gay Collection	255
The Darwin Collection	255
Localities	255
Santa Cruz, Argentina	255
Port San Julián, Argentina	256
Puerto Deseado, Argentina (= Port Desire)	256

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San José, Valdés Peninsula, Argentina (= St. Joseph)	256
Mouth of the Río Negro, Argentina	256
La Bajada, Argentina (= Bajada; Bajada Grande; Bajada de Santa Fé; 'Santa Fé')	256
Cahuil, Topocalma and Navidad, Chile	256
Chiloé, Chile	256
Systematic palaeontology	257
Bivalvia	257
<i>actinodes</i> Sowerby, 1846 [<i>Pecten</i>]	257
<i>aerea</i> Hupé, 1854 [<i>Venus</i>]	257
<i>alta</i> Sowerby, 1846 [<i>Cucullaea</i>]	259
<i>alternans</i> Sowerby, 1846 [<i>Anomia</i>]	259
<i>alvarezii</i> d'Orbigny, 1842 [<i>Ostrea</i>]	259
<i>auca</i> d'Orbigny, 1842 [<i>Mactra</i>]	259
<i>baylii</i> Hupé, 1854 [<i>Venus</i>]	259
<i>bonplandiana</i> d'Orbigny, 1842 [<i>Arca</i>]	260
<i>brevirostrum</i> Hupé, 1854 [<i>Amphidesma</i>]	261
<i>centralis</i> Sowerby, 1846 [<i>Pecten</i>]	261
<i>chilensis</i> d'Orbigny, 1842 [<i>Venus</i>]	263
<i>cleryana</i> d'Orbigny, 1842 [<i>Venus</i>]	263
<i>colchaguana</i> Hupé, 1854 [<i>Mactra</i>]	264
<i>colchaguensis</i> Hupé, 1854 [<i>Pectunculus</i>]	264
<i>coquandi</i> Hupé, 1854 [<i>Venus</i>]	264
<i>coquimbensis</i> d'Orbigny, 1842 [<i>Panopea</i>]	264
<i>darwinianus</i> d'Orbigny, 1842 [<i>Pecten</i>]	264
<i>darwinii</i> Sowerby, 1846 [<i>Mactra</i>]	266
<i>diluvii</i> d'Orbigny, 1842 [<i>Unio</i>]	266
<i>elegans</i> Hupé, 1854 [<i>Nucula</i>]	266
<i>ferrarisii</i> d'Orbigny, 1842 [<i>Ostrea</i>]	268
<i>gaudichaudi</i> d'Orbigny, 1842 [<i>Perna</i>]	268
<i>geminatus</i> Sowerby, 1846 [<i>Pecten</i>]	268
<i>glabra</i> Sowerby, 1846 [<i>Nucula</i> ?]	269
<i>hanetianus</i> d'Orbigny, 1842 [<i>Venus</i>]	269
<i>hanetianus</i> d'Orbigny, 1842 [<i>Solenocurtus</i>]	269
<i>insolita</i> Sowerby, 1846 [<i>Trigonocelia</i>]	269
<i>insulsa</i> Hupé, 1854 [<i>Venus</i>]	270
<i>laevigata</i> Sowerby, 1846 [<i>Corbis</i> ?]	270
<i>lyellii</i> Sowerby, 1846 [<i>Crassatella</i>]	272
<i>maxima</i> Hupé, 1854 [<i>Ostrea</i>]	272
<i>meridionalis</i> Sowerby, 1846 [<i>Venus</i>]	272
<i>multiradiatum</i> Sowerby, 1846 [<i>Cardium</i>]	272
<i>munsterii</i> d'Orbigny, 1842 [<i>Venus</i>]	275
<i>oblonga</i> Sowerby, 1846 [<i>Tellinides</i> ?]	275
<i>ornata</i> Sowerby, 1846 [<i>Nucula</i>]	275
<i>paranensis</i> d'Orbigny, 1842 [<i>Pecten</i>]	276
<i>patagonensis</i> d'Orbigny, 1842 [<i>Pecten</i>]	276
<i>patagonica</i> d'Orbigny, 1842 [<i>Ostrea</i>]	277
<i>patagonica</i> Sowerby, 1846 [<i>Cardita</i>]	277
<i>paytensis</i> d'Orbigny, 1842 [<i>Pectunculus</i>]	277
<i>petitiana</i> d'Orbigny, 1842 [<i>Venus</i>]	281
<i>platense</i> d'Orbigny, 1842 [<i>Cardium</i>]	281
<i>propinquus</i> Hupé, 1854 [<i>Pecten</i>]	281
<i>puelchum</i> Sowerby, 1846 [<i>Cardium</i>]	283
<i>pulvinata</i> Hupé, 1854 [<i>Venus</i>]	283
<i>radula</i> Hupé, 1854 [<i>Amphidesma</i>]	283
<i>rostrata</i> Hupé, 1854 [<i>Ostrea</i>]	283
<i>rouaultii</i> Hupé, 1854 [<i>Venus</i>]	285
<i>rudis</i> Sowerby, 1846 [<i>Pecten</i>]	285

<i>rugata</i> Sowerby, 1846 [<i>Maetra</i> ?]	285
<i>simplex</i> Hupé, 1854 [<i>Panopea</i>]	285
<i>subalbicans</i> Hupé, 1854 [<i>Venus</i>]	285
<i>sulculosa</i> Sowerby, 1846 [<i>Cytherea</i>]	287
<i>tenuicostatus</i> Hupé, 1854 [<i>Pecten</i>]	287
<i>transitoria</i> Hupé, 1854 [<i>Ostrea</i>]	287
<i>variabilis</i> Hupé, 1854 [<i>Amphidesma</i>]	287
<i>villanovae</i> Hupé, 1854 [<i>Venus</i>]	289
Gastropoda	289
<i>affinis</i> Hupé, 1854 [<i>Turritella</i>]	289
<i>alta</i> Sowerby, 1846 [<i>Voluta</i>]	289
<i>ambigua</i> d'Orbigny, 1842 [<i>Bulla</i>]	289
<i>ambiguus</i> Sowerby, 1846 [<i>Monoceros</i>]	291
<i>ambulacrum</i> Sowerby, 1846 [<i>Turritella</i>]	291
<i>antiquata</i> d'Orbigny, 1842 [<i>Chilina</i>]	291
<i>armatum</i> Hupé, 1854 [<i>Triton</i>]	291
<i>blainvillei</i> d'Orbigny, 1842 [<i>Monoceros</i>]	291
<i>cepa</i> Sowerby, 1846 [<i>Gastroidium</i>]	293
<i>chilensis</i> Sowerby, 1846 [<i>Turritella</i>]	293
<i>chiloensis</i> Hupé, 1854 [<i>Oliva</i>]	293
<i>clathratus</i> Hupé, 1854 [<i>Fusus</i>]	293
<i>cleryanus</i> d'Orbigny, 1842 [<i>Fusus</i>]	295
<i>collaris</i> Sowerby, 1846 [<i>Trochus</i>]	295
<i>cosmophila</i> Sowerby, 1846 [<i>Bulla</i>]	295
<i>costellata</i> Sowerby, 1846 [<i>Terebra</i>]	296
<i>dimidiata</i> Sowerby, 1846 [<i>Oliva</i>]	296
<i>discors</i> Sowerby, 1846 [<i>Pleurotoma</i>]	296
<i>distans</i> Sowerby, 1846 [<i>Pyrula</i>]	296
<i>echinulata</i> Hupé, 1854 [<i>Pleurotoma</i>]	297
<i>elegans</i> Hupé, 1854 [<i>Sigaretus</i>]	297
<i>gaudichaudi</i> d'Orbigny, 1842 [<i>Rostellaria</i>]	297
<i>gregarea</i> Sowerby, 1846 [<i>Crepidula</i>]	297
<i>kieneri</i> Hupé, 1854 [<i>Concholepas</i>]	297
<i>labiale</i> Hupé, 1854 [<i>Monoceros</i>]	299
<i>laevis</i> Sowerby, 1846 [<i>Trochus</i>]	299
<i>lanceolata</i> Hupé, 1854 [<i>Pleurotoma</i>]	299
<i>leucostomoides</i> Sowerby, 1846 [<i>Triton</i>]	299
<i>monilifer</i> Sowerby, 1846 [<i>Cassis</i>]	300
<i>noachinus</i> Sowerby, 1846 [<i>Fusus</i>]	300
<i>opimum</i> Hupé, 1854 [<i>Monoceros</i>]	300
<i>orbignyi</i> Hupé, 1854 [<i>Fusus</i>]	300
<i>orbignyi</i> Hupé, 1854 [<i>Natica</i>]	300
<i>ornata</i> Sowerby, 1846 [<i>Struthiolaria</i>]	300
<i>pachystoma</i> Hupé, 1854 [<i>Natica</i>]	302
<i>patagonica</i> Sowerby, 1846 [<i>Turritella</i>]	302
<i>petitianus</i> d'Orbigny, 1842 [<i>Fusus</i>]	303
<i>pumila</i> Sowerby, 1846 [<i>Natica</i>]	303
<i>pyruliformis</i> Sowerby, 1846 [<i>Fusus</i>]	303
<i>regularis</i> Sowerby, 1846 [<i>Fusus</i>]	303
<i>rouaultii</i> Hupé, 1854 [<i>Trochus</i>]	303
<i>rugulosa</i> Sowerby, 1846 [<i>Scalaria</i>]	305
<i>serena</i> d'Orbigny, 1842 [<i>Oliva</i>]	305
<i>simplex</i> Hupé, 1854 [<i>Oliva</i>]	305
<i>solida</i> Sowerby, 1846 [<i>Natica</i>]	305
<i>striatonodosus</i> Hupé, 1854 [<i>Fusus</i>]	306
<i>striolata</i> Sowerby, 1846 [<i>Natica</i>]	306
<i>subaequalis</i> Sowerby, 1846 [<i>Pleurotoma</i>]	306

<i>subglobosus</i> Sowerby, 1846 [<i>Sigaretus</i>]	306
<i>subreflexus</i> Sowerby, 1846 [<i>Fusus</i>]	307
<i>sulcatus</i> Hupé, 1854 [<i>Fusus</i>]	307
<i>suturalis</i> Sowerby, 1846 [<i>Turritella</i>]	307
<i>triplicata</i> Sowerby, 1846 [<i>Voluta</i>]	307
<i>tuberculifera</i> Hupé, 1854 [<i>Cassidaria</i>]	309
<i>tumorifera</i> Hupé, 1854 [<i>Oliva</i>]	309
<i>turbinelloides</i> Sowerby, 1846 [<i>Pleurotoma</i>]	309
<i>undulifera</i> Sowerby, 1846 [<i>Terebra</i>]	309
<i>verruculosus</i> Sowerby, 1846 [<i>Triton</i>]	310
Scaphopoda	310
<i>corrugatus</i> Hupé, 1854 [<i>Dentalium</i>]	310
<i>giganteum</i> Sowerby, 1846 [<i>Dentalium</i>]	310
<i>intermedium</i> Hupé, 1854 [<i>Dentalium</i>]	310
<i>majus</i> Sowerby, 1846 [<i>Dentalium</i>]	310
<i>sulcosum</i> Sowerby, 1846 [<i>Dentalium</i>]	310
Acknowledgments	311
References	311

INTRODUCTION

The first Tertiary molluscs described from Chile and Argentina were those collected by Alcide d'Orbigny during his expedition to South America in the years 1826–1833. D'Orbigny collected Tertiary invertebrates in Entre Ríos and northern Patagonia in Argentina as well as in Central Chile. He also obtained some material from Peru. The results of his work were published in his monumental *Voyage dans l'Amérique Méridionale* (d'Orbigny 1835–1847), of which the Palaeontology section comprises volume 3, part 4, published in 1842.

Shortly after d'Orbigny, Darwin visited South America on board HMS Beagle. During his trip to South America, Darwin visited most of the localities where d'Orbigny had collected his Tertiary molluscs. In addition he also visited southern Patagonia. The Tertiary molluscs collected by him were described by G. B. Sowerby II and published in an Appendix to Darwin's *Geological Observations on South America* (Darwin 1846). After them, Claude Gay was appointed to the post of Director of the National Museum of Natural History in Santiago, Chile. Upon his return to France, he took with him his large collection of fossils, a situation commented on by Philippi (1887) on the first page of his book on Tertiary fossils from Chile. Gay gave these fossils to H. Hupé, who described them as part of Gay's *Historia Física y Política de Chile* (Gay 1844–1854). The 8th volume of the Zoological part – containing shells and fossils – was published in 1854 and it is obvious that, while d'Orbigny and Sowerby were in very close contact, Hupé did not even know of Sowerby's publication and, thus, produced a considerable number of synonyms.

These three collections were the basis for all future studies on the Tertiary molluscan faunas of southern South America. Because of the large number of taxa introduced by these three authors, the importance of their collections cannot be overstated. However, in many instances these collections posed a challenge for later taxonomists. They were all assembled during the first half of the nineteenth century and

the knowledge available then on molluscs, both fossil and extant, was still scanty compared to the information amassed on this group since then. This fact is reflected in the taxonomic conclusions on the faunas that these authors studied. Another problem is that their collections included, in many cases, poorly preserved material. Therefore, their descriptions and illustrations of many new species are insufficient and often the taxonomic position of these taxa must remain uncertain even today. In this respect, matters become even worse as data on localities and stratigraphic provenance of their material is frequently vague and impossible to clarify satisfactorily. For instance, d'Orbigny lists 'Santa Fé' as the locality for some of his Tertiary mollusc specimens. However, no marine rocks of this age are exposed in Santa Fé, whether the city or the province thus named are considered. Instead, the specimens come from the locality (also mentioned, and more frequently, by d'Orbigny) known as La Bajada. The full name of this locality is La Bajada de Santa Fé (Santa Fé Landing), as it lies across the Paraná river, on its left bank located in the province of Entre Ríos, where the modern city of Paraná has been built. Therefore, special care should be taken when attempting to identify these old localities, in order to avoid further confusion with locality names.

D'Orbigny and Gay housed their collections in the Muséum National d'Histoire Naturelle (MNHN) in Paris, while Darwin did so in the British Museum (Natural History) in London. Ever since, these collections have received little attention from researchers (albeit because of the long distances involved and the impossibility of personally checking the collections) on South American Tertiary molluscs. Most authors based their identifications and comparisons with early taxa on the published descriptions and illustrations. This has sometimes led to confusion and misidentifications, a natural consequence of poor understanding of the type material involved.

In this paper we attempt to put together all the available information on the type material of the three collections. For each taxon introduced by d'Orbigny, Sowerby and Hupé,

we provide, where possible, an updated generic placement, original reference, data on the type material, type localities and repository and comments on the taxonomic status of the name. Most of the type localities were visited and, whenever possible, the stratigraphic provenance of the type material was identified or at least circumscribed as closely as possible. For this we relied on our own knowledge of the area as well as on the specific data provided by the authors, whether in their paleontological descriptions, in the historical and/or geological accounts of their expeditions or in original catalogues accompanying the collections.

MATERIAL

The d'Orbigny Collection

This collection, mostly assembled by d'Orbigny himself in South America, is housed in two different laboratories at the Muséum National d'Histoire Naturelle in Paris. Part of it is in the Laboratoire de Paléontologie, where the catalogues, compiled by Hupé, are arranged stratigraphically according to d'Orbigny's system of Étages. Most of the South American Tertiary material is included in the Catalogue 'Falunien B'. However, in some cases the material is missing and/or misplaced and/or misidentified. We have searched through the material thoroughly and present here, under each species, a detailed account of the state and status of the type material, as well as the correct Catalogue numbers of any material transferred to the Typothèque (types collection) of the Laboratoire de Paléontologie.

A second part of the collection was never entered into the Catalogues of Paléontologie. This material remained in the collections of the Laboratoire de Géologie and was housed there, together with rock samples from d'Orbigny's South American Expedition, under Catalogue 3L. Among the rock samples, we were able to identify the type material of several species. These we separated and an appropriate catalogue number for the Typothèque of the Laboratoire de Géologie was attached to them. As for the part of the collection in the Laboratoire de Paléontologie, we also give an account of the state and status of the type material.

In addition to his own material, which d'Orbigny described in his *Voyage*, some taxa were based on material collected by other travellers. Thus, material identified in the Gaudichaud Collection and housed in the Laboratoire de Géologie under Catalogue 20 was described and illustrated by d'Orbigny. It is also included and an appropriate collection number has also been attached to it.

The Gay Collection

The Gay Collection is housed entirely in the Laboratoire de Géologie at the Muséum National d'Histoire Naturelle, under Catalogue 8P 'Des Roches du Chili et du Pérou recueillies par Mr Gay dans les années 1831 à 1842'. The Collection – housed in the basement of the Géologie et Mineralogie building at the MNHN – was searched and the available types were recovered and are now housed in the Typothèque of the Laboratoire de Géologie. In a few instances the material is seemingly lost. However, over the years the collection has undergone several relocations and it is not unlikely that miss-

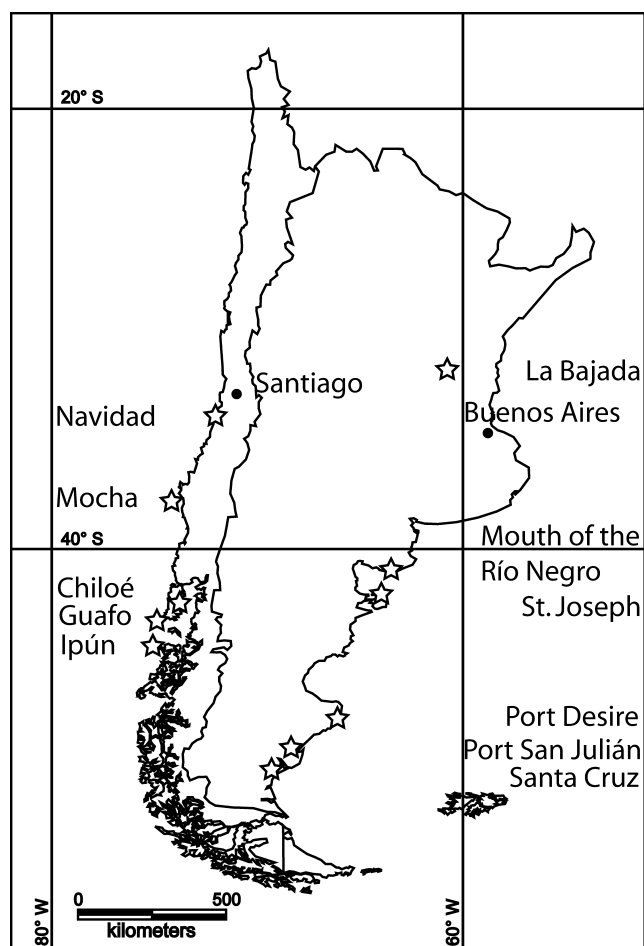


Figure 1 Type localities of Tertiary molluscs mentioned in the text.

ing pieces may be misplaced within the Gay Collection or in other collections from overseas housed in the same room in the basement of Géologie et Mineralogie.

The Darwin Collection

The collection of South American Tertiary fossils assembled by Darwin during his trip around the world in HMS Beagle is housed in the Department of Palaeontology at The Natural History Museum, London (formerly the British Museum (Natural History)). The material is perfectly well curated and the types are easily identified by means of the catalogue numbers assigned to each specimen. However, as stated under each appropriate specific entry in the Systematic Paleontology section, below, a few of the type specimens are missing.

LOCALITIES

Most type localities (Fig. 1) are briefly explained under each species. However, some of them require a more detailed explanation.

Santa Cruz, Argentina

Sowerby (1846) listed Santa Cruz as the locality from which Darwin collected some of the specimens described by him.

This locality surely refers to the cliffs along the southern coast of the Santa Cruz river estuary, a few kilometres upstream from its opening into the Atlantic Ocean. The rocks exposed throughout these cliffs are included in the Monte León Formation, a unit formally described by Bertels (1970). That author subdivided the Monte León Formation into two members, a lower member which she called Monte Entrada and an upper member that she named Monte Observación (Bertels 1978). Of the two, the only one exposed along the cliffs at Santa Cruz is the Monte Entrada Member. The age of this unit is now considered late Oligocene–early Miocene, or even early Miocene (Barreda & Palamarczuk 2000).

Port San Julián, Argentina

This locality refers to the area surrounding the bay of San Julián, about 120 km North of Santa Cruz. The rocks exposed in this area are included in the San Julián and Monte León formations. The former is exposed at the base of the cliffs to the north of the present town of San Julián. It was first formally described by Bertels (1970), who later distinguished two members (Bertels 1977), i.e. the Gran Bajo and Meseta Chica members. The outcrops along the coast from where Darwin probably collected his material belong in the Meseta Chica Member, which is of Oligocene age (Barreda 1997). However, at least some of Darwin's specimens (e.g. one of the specimens of *Pecten centralis*) comes from the Monte León Formation, which at San Julián overlies the San Julián Formation.

Puerto Deseado, Argentina (= Port Desire)

This locality, mentioned by Sowerby (1846), remains somewhat uncertain, although it must lie a few kilometres inland from Port Desire, an area surveyed by Darwin during his trips to Patagonia. The nearest rocks containing marine Cenozoic molluscs are exposed about 20 km from the present town of Puerto Deseado. They are included in the 'Patagoniano', an informal name for the marine mollusc-bearing rocks of Oligocene–Miocene age from southern Patagonia (Bellosi 1995).

San José, Valdés Peninsula, Argentina (= St. Joseph)

This locality was mentioned by Darwin (1846) and the material he collected there comes from an unidentified bed within the Puerto Madryn Formation (Haller 1979), a unit representing the late Miocene 'Enterrriense' transgression (del Río 1992, 1994; del Río & Martínez Chiappara 1998a; del Río *et al.* 2001).

Mouth of the Río Negro, Argentina

This locality was surveyed by d'Orbigny during his trip to South America and he measured sections and collected fossil material along the coastal area immediately South and West of the mouth of the Río Negro (i.e. the northern coast of the San Matías Gulf). The rocks exposed here are mainly continental, but carry a marine intercalation from which the fossil invertebrates come. This intercalation is variably exposed along the cliff between the mouth of the river and a few kilometres east of the town of San Antonio Oeste, to the West.

At the localities mentioned by d'Orbigny the marine intercalation carries an abundant fauna of oysters, pectinids and anomids. The rocks have been included in the Pliocene Río Negro Formation (Andreis 1965) by some authors (Farinati *et al.* 1981; Zavala & Freije 2000; Zavala *et al.* 2000), or in the Barranca Final Formation (Kaasschieter 1963) by Gelós *et al.* (1992). Zambrano (1972) and Yrigoyen (1975) stated that these deposits belonged in the late Pliocene–Pleistocene Belén Formation (Kaasschieter 1965), and represented supraneritic deposits that to the west were replaced by the Río Negro Formation. Malumián (1999) interpreted these marine intercalations as the end of the Miocene transgression ('Enterrriense') that covered northern Patagonia and most of Central Argentina (del Río & Martínez Chiappara 1998a) during the late Miocene, suggesting for them a late Miocene–Pliocene age.

La Bajada, Argentina (= Bajada; Bajada Grande; Bajada de Santa Fé; 'Santa Fé')

This locality, mentioned by d'Orbigny (1842), refers to the location of the present city of Paraná, in the province of Entre Ríos (Argentina). The locality, however, is now almost completely urbanised and the exposures are no longer available. Also known as La Bajada de Santa Fé, this name led to some confusion as some of the material collected by d'Orbigny is labelled 'Santa Fé'. There can be no doubt that he meant La Bajada de Santa Fé, as there are no mollusc-bearing marine rocks exposed along the right bank of the Paraná river, i.e. in the province of Santa Fé. The fossil invertebrates collected by d'Orbigny come from the Paraná Formation (Bravard 1858; Yrigoyen 1969), a unit believed to be late Miocene in age (del Río 1991; del Río & Martínez Chiappara 1998a).

Cahuil, Topocalma and Navidad, Chile

Hupé (1854) often gave Cahuil as a type locality. However, as was already noted by Philippi (1887), there are no Tertiary deposits near Cahuil. Catalogue 8P, listing the Gay collection from Chile – and also written by Hupé – frequently gives Topocalma or Navidad instead of Cahuil. Cahuil is, therefore, interpreted as being only the next largest village at that time and not the actual locality, which we consider to be the area around Navidad. Topocalma is a locality at the southern limit of the Navidad Formation (see Encinas *et al.* 2006). The Navidad Formation was originally introduced by Darwin for the coastal bluffs near Navidad, but he noted that it continued some distance inland. Tavera (1979) divided the formation into three members, which were recently elevated to formation rank by Encinas *et al.* (2006). The name Navidad Formation was restricted to Tavera's lowermost member, which agrees with Darwin's original concept. The, thus redefined, Navidad Formation was dated using planktic foraminifera to be late Miocene to early Pliocene in age (Finger *et al.* 2007), but the mollusc fauna is reworked (Finger *et al.* 2007) and has an early Miocene age (DeVries & Frassinetti 2003; Nielsen & Glodny 2006).

Chiloé, Chile

Hupé's (1854) locality of Chiloé usually refers to the coastal cliffs at Cucao. Sowerby (1846) usually lists it as simply the east coast of Chiloé, while Darwin (1846: 121) states

that his specimens came from 'one layer on the N.W. side of Lemuy [. . .]. I found marine remains only in one spot, in some concretions of hard calcareous sandstone.'

SYSTEMATIC PALAEONTOLOGY

The systematic section of this paper is divided into three parts, namely, Bivalvia, Gastropoda and Scaphopoda. In each part, species are entered alphabetically under the specific name originally used by the author, with the original generic name in square brackets. This is followed by the name (centred) under the correct generic assignment and, where applicable, the status of the name (*nomen dubium*, new combination, etc). Synonymy lists are not exhaustive and only include those references in which material (whether types or not) was illustrated or those in which new combinations were proposed by subsequent authors. As this paper focuses on the three collections, younger synonyms encountered during revision of the faunas are usually not included. However, younger synonyms are included in those cases in which the synonymy has already been published or, of course, in the case of replacement names.

Taxonomic terms and abbreviations: v, material studied by the authors; *, first description of taxon to which the assignment of specimen refers.

Institutional abbreviations used in this work are as follows:

NHM = The Natural History Museum, London, Department of Palaeontology, (Darwin Collection).

MNHN-BIMM = Muséum national d'Histoire naturelle, Centre Biologie des Invertébrés Marins et Malacologie, Laboratoire de Malacologie, Paris.

MNHN = Muséum national d'Histoire naturelle, Paris (d'Orbigny, Gay and Gaudichaud Collections).

SGO.PI = Museo Nacional de Historia Natural, Paleontología de Invertebrados, Santiago, Chile.

Bivalvia

actinodes Sowerby, 1846 [*Pecten*]

Zygochlamys actinodes (Sowerby, 1846) (Pl. 1, fig. 1)

v*1846 *Pecten actinodes* Sowerby: 253, pl. 3, fig. 33.

1921 *Chlamys theresinae*; Roveretto: 27, fig. 27a.

1992 *Chlamys actinodes* (Sowerby); del Río: 27–30, pl. 5, figs 1–4; pl. 6, figs 1–2; text figs 5–8.

2000 '*Chlamys*' *actinodes*; del Río: fig. 10.2.

2002 *Chlamys actinodes* (Sowerby, 1846); Martínez & del Río fig. 13.1.

TYPE MATERIAL. Lectotype: NHM-L27960, a left valve, less complete than suggested by the figure (Sowerby 1846: pl. 3, fig. 33), with a fragment missing from the antero-ventral margin, with two small oysters attached to the disc on the postero-dorsal margin and with the anterior margin of the anterior auricle sloping strongly forward and almost completely straight, from San José; paralectotype: NHM-L27983, a juvenile right valve from San José; paralectotype:

NHM-L27982, a large (height 115 mm, width 120 mm), complete and well preserved right valve, with the umbo and auricles a little hidden in the soft fawn-weathered sandstone, from San José. The identity of this specimen is doubtful but it certainly belongs in a different genus.

TYPE LOCALITY. 'San José, Patagonia'. As pointed out by del Río (1992: 26), the type locality of this species must remain uncertain, as the reference given by Darwin (1846) suggests it may come from anywhere in the Valdés Peninsula area, in northeastern Chubut, Argentina. The exact stratigraphical provenience of the material is also uncertain, but it certainly comes from a bed within the late Miocene Puerto Madryn Formation, where this species is quite common.

REMARKS. Del Río (1992: text fig. 7) illustrated a cast of the left valve labelled NHM-L27960, which she referred to as the 'holotype'. Apparently she was unaware of the existence of the other syntypes (see del Río 1992: 26). Sowerby's original description does not clearly imply that there was more than one specimen. Therefore, this 'designation by inference of holotype' is valid according to Article 74.6 of the ICZN (1999).

aerea Hupé, 1854 [*Venus*]

Retrotapes exalbidus (Dillwyn, 1817) (Pl. 1, figs 2–4)

v1854 *Venus aerea* Hupé: 338–339.

v1854 *Venus subalbicans* Hupé: 339.

v1887 *Venus aerea* Hupé; Philippi: 111–112.

v1887 *Venus subalbicans* Hupé; Philippi: 122.

TYPE MATERIAL. There are three syntypes and two fragments in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/57. They are labeled *Venus aereana* Hupé.

TYPE LOCALITY. 'Quiriquina, cerca de Concepción' [Quiriquina Island, near Concepción, Chile].

REMARKS. This species was neither mentioned nor figured by Frassinetti (1974) in his list of *Venus* from Chile. The type material belongs in *Retrotapes* del Río, 1997 (p. 90), a possible junior synonym of *Frigichione* Fletcher, 1938 [type species *Frigichione permagna* Fletcher, 1938]. The only available specimens are close to *Retrotapes exalbida* (Dillwyn, 1817), an extant species living along the coasts of southern South America.

This species has not been reported from Cretaceous or Paleocene rocks exposed on Quiriquina Island (Wilckens 1904; Stinnesbeck 1986) and the excellent preservation demonstrates that such a provenance is incorrect. Although the published type locality is Quiriquina, Catalogue 8P states 'Arauco' as the locality. If such a mistake were proven and the material did actually come from the Pliocene Tubul Formation of Arauco, then this species would be a synonym of *Retrotapes exalbidus*, a common species in Arauco. This scenario is most likely, and *Venus aerea* and *V. subalbicans* have been synonymised with *Retrotapes exalbidus* by S.N. Nielsen & C. Valdovinos (unpublished results) after their revision of a large suite of specimens from the Tubul Formation. Those authors also provided an extensive synonymy list.

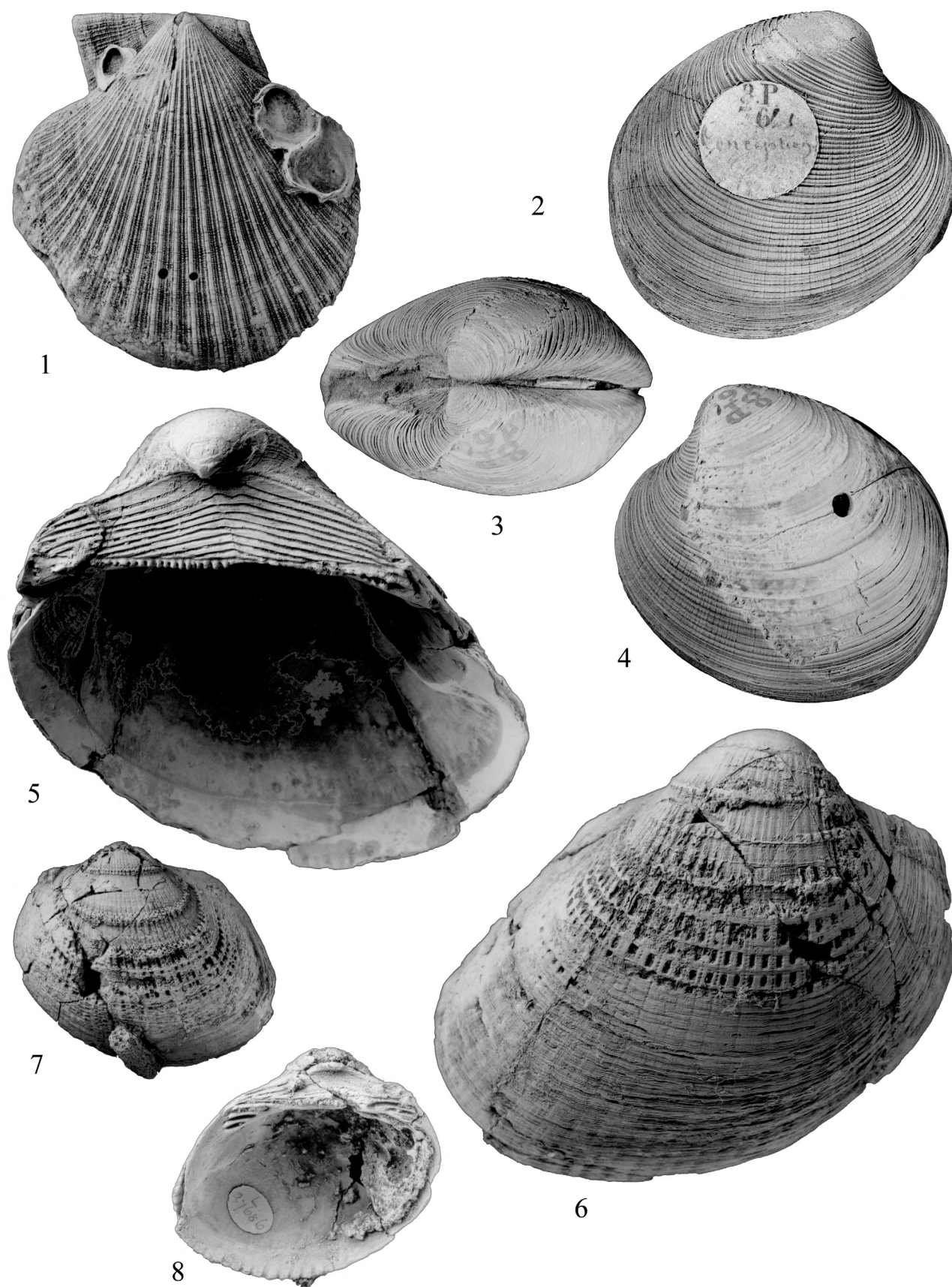


Plate 1 Fig. 1 *Zygochlamys actinodes* (Sowerby, 1846). Lectotype NHM-L27960 (height = 63.6 mm). Figs 2–4 *Retrotapes exalbidus* (Dillwyn, 1817). One of three syntypes of *Venus aerea* Hupé, 1854, MNHN Gg2002/57 (height = 58.6 mm). Figs 5–8 *Cucullea alta* Sowerby, 1846. 5–6, syntype NHM-L27685 (height 81.6 mm). 7–8, syntype NHM-L27686 (height 42.6 mm).

alta Sowerby, 1846 [*Cucullaea*]*Cucullaea alta* Sowerby, 1846 (Pl. 1, figs 5–8)

- v*1846 *Cucullaea alta* Sowerby: 252, pl. 2, figs 22–23.
 v 1902 *Cucullaea alta* Sowerby; Ortmann: 86, pl. 25, figs 4a–c.
 v 1904 *Cucullaea multicostata* Ih.; Ihering: 9, figs 2–4 (non Ihering, 1897).
 ? 1937 *Cucullaea calafatensis* n. f.; Feruglio: 172–173, pl. 20, figs 2a–b.
 v 1981 *Cucullaea marshalli* n. sp.; Zinsmeister: 1090–1091, pl. 1, figs 4–5.
 v 1998 *Cucullaea (Monteleonia) alta* (Sowerby); del Río & Camacho: 73–74, pl. 5, fig. 4, pl. 7, figs 4–6.
 v 1999 *Cucullaea alta* Sowerby, 1846; Frassinetti & Covacevich: 18, pl. 2, figs 17–19, pl. 3, fig. 1.
 v 2004b *Cucullaea (Monteleonia) alta* (Sowerby, 1846); del Río: fig. 11.1.

TYPE MATERIAL. Syntypes NHM-L27685 and NHM-L27686.

TYPE LOCALITY. Syntype NHM-L27686 is from Santa Cruz, while NHM-L27685 includes two specimens (a large glued valve and the hinge of another, possibly belonging to the same shell) from Port Desire, about 500 km to the north of Santa Cruz. Both syntypes come from rocks of equivalent age, i.e. late Oligocene–early Miocene.

REMARKS. Syntype NHM-L27686 is the small, broken and glued specimen figured by Sowerby (1846: pl. 2, fig. 23) and showing the interior of the valve. Syntype NHM-L27685 includes two specimens, one of them is a large nearly complete valve of which the hinge only was figured by Sowerby (1846: pl. 2, fig. 22). The other specimen seems to be the incomplete hinge of the opposite valve of the same specimen.

alternans Sowerby, 1846 [*Anomia*]*Pododesmus (Monia) alternans* (Sowerby, 1846) (Pl. 2, figs 1–2)

- v*1846 *Anomia alternans* Sowerby: 252, pl. 2, fig. 25.
 1887 *Anomia alternans* Sow.; Philippi: 209, pl. 55, fig. 12 (from Sowerby).
 v 1969 *Anomia alternans* Sowerby; Herm: 109–110, pl. 5, figs 4–5.

TYPE MATERIAL. Holotype: NHM-L27962.

TYPE LOCALITY. Coquimbo, Chile.

REMARKS. The holotype is an upper (free) valve of a species of *Pododesmus* (*Monia*), in which the muscle scars (i.e. the internal aragonitic layer) are lost but the exterior sculpture is well preserved.

According to Philippi (1887: 209), this species also occurs at Caldera, in northern Chile, while Herm (1969: 110) mentioned it from Chañaral de Azeitunas and La Serena.

alvarezii d'Orbigny, 1842 [*Ostrea*]*Cubitostrea alvarezii* (d'Orbigny, 1842) (Pl. 2, figs 3–4)

- v*1842 *Ostrea Alvarezii* d'Orbigny: 134, pl. 7, fig. 19.
 1901 *Ostrea Alvarezii* D'Orb.; Borchert: 19–20, pl. 1, figs 1–4.

- 1939 *Ostrea Alvarezii* d'Orb.; Wahnish: 150–151, pl. 11, figs 1a–1b.
 1967 *Ostrea alvarezii* d'Orbigny; Camacho: 68, pl. 11, figs 1a–1b.
 1998b ?*Ostrea alvarezii* d'Orbigny, 1842; del Río & Martínez Chiappara: 55, pl. 7, figs 7–8, pl. 13, figs 8–10, pl. 17, figs 1–3.
 2000 '*Ostrea*' *alvarezii*; del Río: figs 10.7, 10.8.

TYPE MATERIAL. The only specimen figured by d'Orbigny (1842: pl. 7, fig. 19) is the left valve housed in the Typothèque of the Laboratoire de Paléontologie at the MNHN in Paris, under number MNHN A14085, as '*Ostrea Ferrarisi*' (both in Catalogue Falunien B and on the label with the specimen). As d'Orbigny described the right valve as well, we assume that there should have been other syntypes. One of them is present in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2005/1.

TYPE LOCALITY. '...à la Bajada, province d'Entre Ríos, république Argentine... au sein des grès blanchâtres quartzeux des terrains tertiaires marins...' [... at la Bajada, province of Entre Ríos, Argentine Republic... within the whitish quartz sands of the marine beds...].

REMARKS. The specimen figured by d'Orbigny is a juvenile of this widespread oyster known from Entre Ríos and northern Patagonia. It is attached to a small pectinid. According to ICZN (1999) Article 33.4, the original spelling *alvarezii* must be used for this species.

auca d'Orbigny, 1842 [*Macra*]*Macra? auca* d'Orbigny, 1842 (Pl. 2, figs 5–6)

- *1842 *Macra auca* d'Orbigny: 125, pl. 14, figs 19, 20.
 1887 *Venus controversa* Philippi: 126, pl. 31, fig. 3 (from d'Orbigny) (as *Macra auca* on the plate).

TYPE MATERIAL. The type material of this species could not be located in the Collections at the MNHN in Paris. It is presumably lost.

TYPE LOCALITY. '...dans le grès tertiaire des environs de Coquimbo, au nord du Chili' [... in the Tertiary sand around Coquimbo, in northern Chile].

REMARKS. This species is known only from the holotype, which is an internal mould. Although it is lost, the figure provided by d'Orbigny (1842: pl. 14, fig. 19, 20) is enough to assess that it is an unidentifiable species and thus a *nomen dubium*.

According to Philippi (1887: 126) this species does not belong in *Macra* but in *Venus*. Therefore, as the specific name *auca* was preoccupied by d'Orbigny himself, he introduced a new name for it, i.e. *Venus controversa*.

baylii Hupé, 1854 [*Venus*]*Pitar? baylii* (Hupé, 1854) (Pl. 2, figs 7–9)

- v*1854 *Venus Baylii* Hupé: 340.
 1887 *Artemis (Venus) Baylii* Hupé; Philippi: 108.

TYPE MATERIAL. There are three syntypes of this species in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/48.

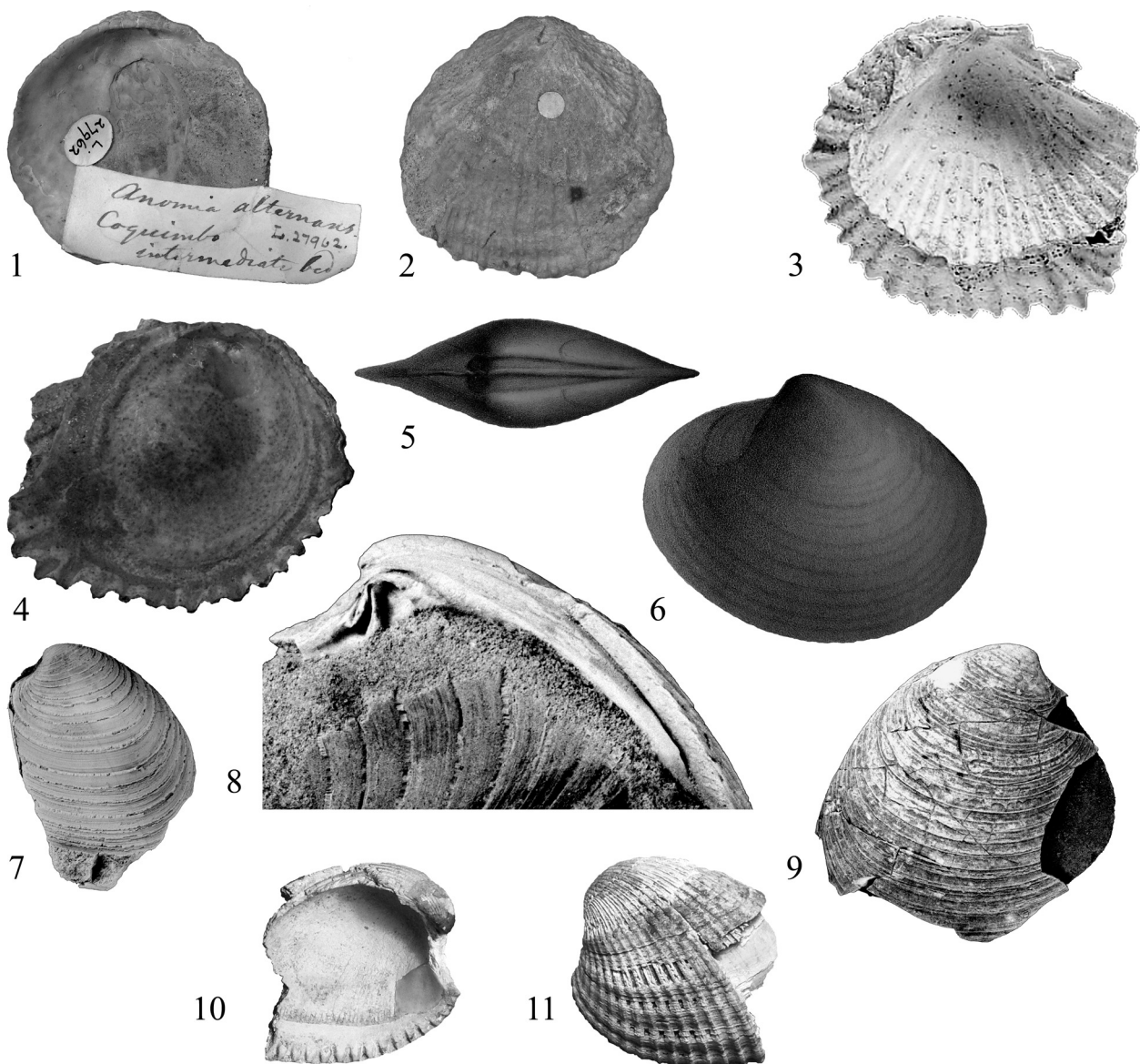


Plate 2 Figs 1–2 *Pododesmus (Monia) alternans* (Sowerby, 1846). Holotype NHM-L27962 (diameter = 40 mm). Figs 3–4 *Cubitostrea alvarezii* (d'Orbigny, 1842). Syntype MNHN-A14085 (height = 42.1 mm). Figs 5–6 *Mactra auca* d'Orbigny, 1842, from pl. 14, figs 19 & 20 of d'Orbigny. Figs 7–9 *Pitar? baylii* (Hupé, 1854). 7, syntype MNHN Gg2002/48–2 (height with rock = 36.6 mm). 8–9, syntype MNHN Gg2002/48–1 (height = 44 mm). Figs 10–11 *Anadara bonplandiana* (d'Orbigny, 1842). Syntype MNHN-A13944 (height = 30 mm).

TYPE LOCALITY. 'Chiloé'. Chiloé Island, Chile. Most probably it comes from Cucao.

REMARKS. The material is very poor, but enough shell is left to suggest it might belong in *Pitar* Römer, 1857. The smaller syntype closely resembles *Chione rodulfi* Frassinetti & Covacevich, 1993 (p. 89–91, figs 33–36) from the Navidad Formation (early to middle Miocene) of Matanzas, Chile. The only apparent difference between the two species is the general shell outline and the better developed ornamentation in the material from Matanzas.

***bonplandiana* d'Orbigny, 1842 [*Arca*]**

Anadara bonplandiana (d'Orbigny, 1842) (Pl. 2, figs 10–11)

v*1842 *Arca Bonplandiana* d'Orbigny: 130, pl. 14, figs 15–18.

- 1893 *Arca lirata* Philippi: 11, pl. 1, fig. 14 (*non* Philippi, 1887).
- 1936 *Arca bonplandiana* Orb. var. *chubutensis* Feruglio: 135–136, pl. 2, figs 11a–11b.
- 1939 *Arca Bonplandiana*, d'Orb.; Wahnish: 149, pl. 2, figs 3a–3b.
- 1966 *Anadara bonplandiana* (d'Orbigny); Camacho: 55–56, pl. 8, figs 10a–10b.
- 1987 *Anadara (Rasia) lirata* Philippi; del Río: 483–484, pl. 1, fig. 2.
- 1987 *Anadara (Rasia) bravardi* n. sp.; del Río: 484–485, pl. 1, fig. 3.
- 1987 *Anadara (Rasia) plana* n. sp.; del Río: 485, pl. 1, fig. 4.
- 1987 *Scapharca (Potiarca) diamantensis* n. sp.; del Río: 487, pl. 2, fig. 2.
- 1987 *Scapharca (Potiarca) frenguelli* (Doello Jurado); del Río: 488, pl. 2, fig. 3.

- 1988 *Anadara (Rasia) lirata* (Philippi); del Río, pl. 1, fig. 4.
- 1988 *Anadara (Rasia) bravardi* del Río; del Río, pl. 1, fig. 8.
- 1991 *Anadara (Rasia) lirata* (Philippi); del Río: 31–32, pl. 1, fig. 3; text-figs 3–4, 7.
- 1991 *Anadara (Rasia) bravardi* del Río; del Río: 32–35, text-figs 3–7.
- 1991 *Anadara (Rasia) plana* del Río; del Río: 35–36, text-figs 3–4, 7–8.
- 1991 *Scapharca (Potiarca) bomplandean* (d'Orbigny); del Río: 37–38, pl. 2, fig. 2, text-fig. 10.
- 1991 *Scapharca (Potiarca) diamantensis* del Río; del Río: 38–40, text-figs 9–10.
- 1991 *Scapharca (Potiarca) frenguelli* (Doello Jurado); del Río: 40, pl. 1, fig. 5, text-fig. 10.
- 1992 *Anadara (Rasia) lirata* (Philippi); del Río: 15–16, pl. 1, figs 5–6.
- 1992 *Anadara (Rasia) bravardi* del Río; del Río: 16, pl. 1, figs 2–4.
- 1998a *Potiarca camaronesia* (Ihering); del Río & Camacho: 71–72, pl. 5, figs 2–7.
- 1998b *Anadara (Rasia) lirata* (Philippi, 1893); del Río & Martínez Chiappara: 49–50, pl. 4, figs 8–9, pl. 16, fig. 10, pl. 24, fig. 3.
- 1998b *Anadara (Rasia) bravardi* del Río, 1987; del Río & Martínez Chiappara: 50, pl. 6, figs 3–4; pl. 13, fig. 11; pl. 16, figs 3–4; pl. 24, figs 1–2.
- 1998b *Anadara (Rasia) plana* del Río, 1987; del Río & Martínez Chiappara: 50, pl. 16, fig. 17.
- 1998b *Scapharca (Potiarca) bomplandean* (d'Orbigny, 1842); del Río & Martínez Chiappara: 50–51, pl. 16, figs 14–16, pl. 24, fig. 4.
- 1998b *Scapharca (Potiarca) diamantensis* del Río, 1987; del Río & Martínez Chiappara: 51, pl. 16, figs 7–9.
- 1998b *Scapharca (Potiarca) frenguelli* (Doello Jurado, 1987); del Río & Martínez Chiappara: 51, pl. 16, figs 12–13 (*error pro* Doello Jurado in Frenguelli, 1920: 98; *nomen nudum*).
- 2000 *Potiarca diamantensis*; del Río; fig. 6.
- 2000 *Potiarca bomplandean*; del Río; fig. 7.
- 2002 *Scapharca bomplandean* (d'Orbigny, 1842); Martínez & del Río; fig. 12.2.

TYPE MATERIAL. One syntype in the Typothèque of the Laboratoire de Paléontologie, MNHN-A13944 (Santa Fé); four syntypes in the Typothèque of the Laboratoire de Géologie, MNHN-Gg2005/2 (Ensenada de Ros and mouth of the Río Negro).

TYPE LOCALITY. '...entre le Río Negro et l'Ensenada de Ros, au sud du Carmen de Patagonie; ... à la Bajada, province d'Entre Ríos, république Argentine' [Between the Río Negro and Ensenada de Ros, south of Carmen de Patagones; ... at la Bajada, province of Entre Ríos, Argentine Republic]. Although d'Orbigny (1842: 139) did not mention Santa Fé as a locality, the specimen in the Laboratoire de Paléontologie is certainly a syntype and probably comes from La Bajada, which is directly across the Paraná river in front of the city of Santa Fé. No outcrops of the Paraná Formation or any other marine fossil-bearing unit are exposed at the latter locality.

REMARKS. There is one syntype remaining in the collection of the MNHN, under number MNHN-A13944. This

specimen is a very broken left valve, but might be identified with this widely ranging species. D'Orbigny (1842: 130) stated that it was an uncommon taxon, although this is not really the case, as it occurs frequently in many exposures in Entre Ríos and Northern Patagonia.

In the Typothèque at the Laboratoire de Géologie in the MNHN, under number MNHN-Gg2005/2, there are four additional syntypes labelled 'Arches' from 'entre l'Ensenada de Ros et l'embouchure du Río Negro' [between Ensenada de Ros and the mouth of the Río Negro]. These specimens are very different from the other syntype and from other material referable to this species that we have seen from Patagonia and Entre Ríos (see synonymy above). They are much larger and with a much thicker shell. D'Orbigny himself had noticed this and considered that most of his material comprised juveniles, as he had 'fragments that were at least double in size'. It would probably be necessary to designate a lectotype for *Anadara bonplandiana*, but we refrain from doing so until further collection of material from Ensenada de Ros allows proper assessment of this taxon. The single syntype from Paraná left in the MNHN (Paléontologie) collection is very poorly preserved and a ruling from the ICZN is probably appropriate in order to set aside the available syntypes and select a neotype for this taxon. At present we can only say that the four syntypes numbered MNHN-Gg2005/2 are possibly a different species.

***brevirostrum* Hupé, 1854 [*Amphidesma*]**

'*Amphidesma* *brevirostrum* Hupé, 1854 (Pl. 3, figs 1–3)

v*1854 *Amphidesma brevirostrum* Hupé: 361 (as *Lucina brevirostra*), pl. 6, fig. 1.

1887 *Semele (Amphidesma) brevirostris* Hupé; Philippi: 150, pl. 28, fig. 8 (from Hupé).

TYPE MATERIAL. The only material referable to this species is the holotype, housed in the Typothèque of the Laboratoire de Géologie under number MNHN Gg2002/99.

TYPE LOCALITY. 'Formaciones Eocenas de Coquimbo' [Eocene formations of Coquimbo, Chile]. However, there is no Eocene known from that region as far as we know.

REMARKS. The holotype is a very poorly preserved internal mould in which not even traces of ornamentation are left, contrary to what is depicted in Hupé's figure. It is probably a tellinid, but must remain a *nomen dubium* at present as the holotype is missing characters that would enable identification.

***centralis* Sowerby, 1846 [*Pecten*]**

Jorgechlamys centralis (Sowerby, 1846) (Pl. 3, fig. 4)

v*1846 *Pecten centralis* Sowerby: 253, pl. 3, fig. 31.

1989 *Mesopeplum centralis* (Sowerby); Morra & Erdmann: 120–121, pl. 1, figs 1–2.

v1999 '*Chlamys* *centralis* (Sowerby, 1846); Frassinetti & Covacevich: 24, pl. 4, figs 5–7.

2001 *Equichlamys centralis* (Sowerby, 1846); Beu & Darragh: 52–53.

2004a *Jorgechlamys centralis* (Sowerby, 1846); del Río: 695, figs 6.1–6.10.

2004b *Jorgechlamys centralis* (Sowerby, 1846); del Río: fig. 13.5.

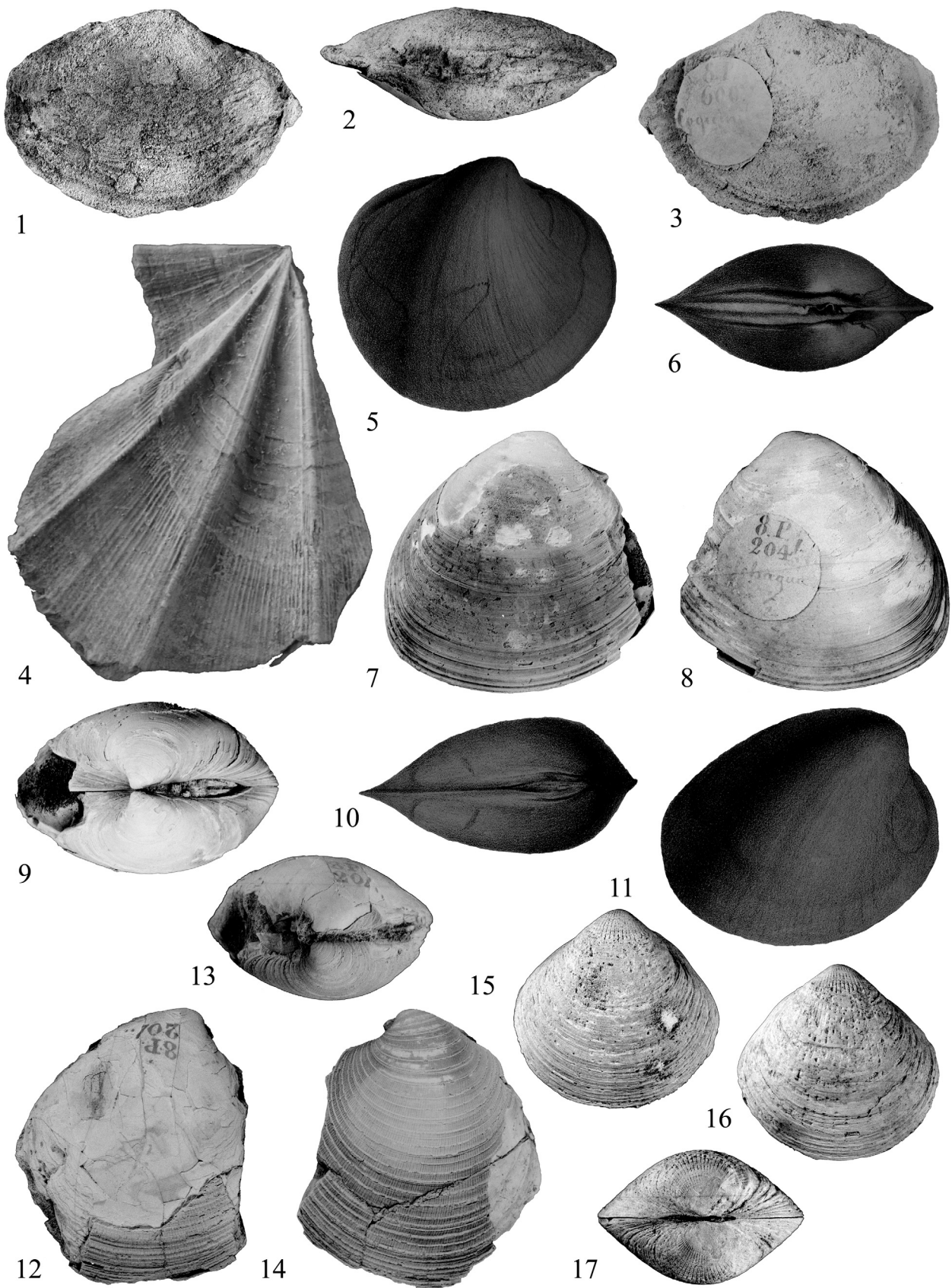


Plate 3 Figs 1–3 *'Amphidesma' brevirostrum* Hupé, 1854. Holotype MNHN Gg2002/99 (height = 37 mm). **Fig. 4** *Jorgechlamys centralis* (Sowerby, 1846). Lectotype NHM-L27696 (height = 78.4 mm). **Figs 5–6** *'Venus' subchilensis* (d'Orbigny, 1852), from pl. 13, figs 12 & 13 of d'Orbigny (1842). **Figs 7–9** *Pitar? colchaguana* (Hupé, 1854). Holotype MNHN Gg2002/82 (height = 47 mm). **Figs 10–11** *'Venus' cleryana* d'Orbigny, 1842, from pl. 13, figs 7 & 8 of d'Orbigny. **Figs 12–14** *Ameghinomya? coquandi* (Hupé, 1854). Holotype MNHN Gg2002/81 (height = 51 mm). **Figs 15–17** *Glycymeris colchaguensis* (Hupé, 1854). Holotype MNHN Gg2002/54 (height = 35.7 mm).

TYPE MATERIAL. Specimen NHM-L27696 was designated lectotype (as 'tipo') by Morra & Erdmann (1989: 121), but as Sowerby's original description clearly implies that there was more than one specimen, their lectotype designation by inference of holotype is invalid (ICZN 1999: Art. 74.5). This specimen is a highly incomplete left valve from 'Port San Julián, Argentina'. Of the two other syntypes, NHM-L27697 (from Port Desire) is a fragment of the disc of a small specimen with very coarse scales on the costal crests, while NHM-L27698 (also from Port Desire) is a small, highly incomplete umbo from a large and flat specimen, i.e. a left valve, with weak surface sculpture and three prominent plicae. Del Río (2004a) has recently reviewed the large pectinids from the Patagonian Cenozoic and illustrated specimen NHM 27696, which she erroneously considered as the holotype (p. 696, fig. 6.10), probably following Morra & Erdmann (1989). Again, this type designation is invalid, as there are other syntypes, as explained above. As one of the other syntypes belongs in a different species, and in order to stabilise nomenclature and avoid further confusion with this species, we follow general usage and formally designate this specimen (NHM 27696) as lectotype.

TYPE LOCALITY. 'Port San Julián, Port Desire', province of Santa Cruz, Argentina. Darwin collected specimen NHM 27696 from the late Oligocene–early Miocene Monte León Formation, which in the area surrounding Port San Julián (albeit not at the exact location of the present city) overlies the San Julián Formation. The other two specimens come from Puerto Deseado (Port Desire). The exact locality and stratigraphical unit from which the latter come is uncertain, but they were probably from the Tertiary beds exposed some 15–20 km inland from Puerto Deseado, the nearest locality with rocks yielding this large pectinid.

REMARKS. The illustration provided by Sowerby appears to be a composite of all three specimens he had available. The width of the main radial costae and the prominence of the scales are greatly overemphasised on the figured specimen, which is the lectotype NHM-L27696. Conversely, paralectotype NHM-L27697 has much coarser scales than the figure, while paralectotype NHM-L27698 accounts for the exaggerated width of the main costae of the figured specimen. This is one of the large pectinids found in the late Oligocene and early Miocene of Patagonia and, as stated by Beu & Darragh (2001: 52–53) fits reasonably well in *Equichlamys* Iredale, 1929 [type species *Pecten bifrons* Lamarck, 1819]. It shares with other members of the genus the large inequivalve shells with few strong ribs and shagreen microsculpture covering the entire shell surface.

In her revision of this species, del Río (2004a) included it in the new genus *Jorgechlamys* del Río, 2004 [type species *Myochlamys juliana* Ihering, 1907], a view which is followed here. Most of the material she described comes from rocks exposed along the southern coast of the San Jorge Gulf and included by her in the San Julián Formation, although the exact relationship of these rocks with the San Julián Formation exposed further south remains to be fully understood. Likewise, the material referred to this species and described and illustrated by Morra & Erdmann (1989), also comes from rocks exposed along the San Jorge Gulf, i.e. Cañadón El Lobo and Bahía Mazarredo. They also included these sediments in the San Julián Formation of Bertels (1970), the type sec-

tion of which lies about 400 km to the south. These rocks are probably referable to other lithostratigraphical units (Bellosi, 1995).

***chilensis* d'Orbigny, 1842 [Venus]**

'*Venus*' *subchilensis* d'Orbigny, 1852 (Pl. 3, figs 5–6)

*1842 *Venus chilensis* d'Orbigny: 124, pl. 13, figs 12, 13 (as *Lucina*) (junior primary homonym of *V. chilensis* Sowerby, 1835).

1852 *Venus subchilensis* d'Orb. 1847; d'Orbigny: 109 (*nomen novum*).

1887 *Artemis chilensis* (*Venus*) D'Orb.; Philippi: 108, pl. 13, fig. 20.

TYPE MATERIAL. According to Catalogue 3L in the MNHN (Paléontologie), the only specimen of this species would be under number 10892 and this should be the holotype. However, it is missing from the collection and the illustration does not allow identification.

TYPE LOCALITY. '...recueilli à Coquimbo (Chili), au sein d'un Grès tertiaire jaunâtre...' (collected by M. Hanet Clery) [...collected at Coquimbo (Chile), within a yellowish tertiary sandstone].

REMARKS. Only the holotype, an internal mould, is known of this species. The material has not been located in the collections of the MNHN and is presumably lost. The illustrations of this specimen (as *Lucina chilensis* d'Orbigny, 1842: pl. 13, figs 12–13) show no characters that would permit identification. Because of the narrow and pointed pallial sinus, Philippi (1887: 108) placed it in *Artemis* (pro *Arthemis* Poli, 1795 [type species *Venus exoleta* Linnaeus, 1758]), an objective synonym of *Dosinia* (*Pectunculus*) da Costa, 1778. Any such generic re-allocations are quite impossible – as is even specific identification with any previously described species from Chile – based on the illustrated steinkern. This species therefore remains a *nomen dubium*.

***cleryana* d'Orbigny, 1842 [Venus]**

'*Venus*' *cleryana* d'Orbigny, 1842 (Pl. 3, figs 10–11)

*1842 *Venus Cleryana* d'Orbigny: 123, pl. 13, figs 7, 8.

1887 *Venus Cleryana* D'Orb.; Philippi: 124, pl. 20, fig. 5.

TYPE MATERIAL. A search through the collections at the MNHN was unsuccessful in locating the holotype of this species. The specimen is presumably lost.

TYPE LOCALITY. 'Grès tertiaires des environs de Coquimbo' (collected by M. Hanet Clery) [Tertiary sand around Coquimbo, Chile].

REMARKS. The only specimen available to d'Orbigny was an unidentifiable internal mould. Philippi's figure of this species (Philippi 1887: 20, fig. 5) is a reproduction of d'Orbigny's plate 13, fig. 7. However, Philippi had one specimen from Coquimbo (SGO.PI.171; see Frassinetti 1974) which he referred to this species, but this specimen has no type status. Designation of a neotype may be required after a revision of the Chilean Cenozoic venerids. Meanwhile this species remains a *nomen dubium*.

colchaguana Hupé, 1854 [*Macra*]*Pitar? colchaguana* (Hupé, 1854) (Pl. 3, figs 7–9)v*1854 *Macra Colchaguana* Hupé: 349.1887 *Macra colchaguensis* Hupé; Philippi: 145.

TYPE MATERIAL. The holotype is housed in the Typothèque of the Laboratoire de Géologie under number MNHN Gg2002/82.

TYPE LOCALITY. ‘Capas de los terrenos terciarios de Cahuil, provincia de Colchagua’ [Tertiary beds of Cahuil, province of Colchagua, i.e. Navidad, central Chile].

REMARKS. The holotype is a closed shell in which the hinge is not visible. Topotypical material in our collections suggests it may be more appropriately placed in *Pitar* Römer, 1857 [type species *Venus tumens* Gmelin, 1791], with which it shares the same hinge pattern. However, a definite generic position must wait until more material is collected.

colchaguensis Hupé, 1854 [*Pectunculus*]*Glycymeris colchaguensis* (Hupé, 1854) (Pl. 3, figs 15–17)v*1854 *Pectunculus Colchaguensis* Hupé: 302.1887 *Pectunculus colchaguensis?* Hupé; Philippi: 184, pl. 37, fig. 8.1979 *Pectunculus colchaguensis* Hupé; Tavera: 86, pl. 15, fig. 33.v1984 *Glycymeris (Glycymeris) colchaguensis* (Hupé, 1854); Frassinetti & Covacevich: 112, figs 2–7.

TYPE MATERIAL. The holotype is housed in the Typothèque of the Laboratoire de Géologie under number MNHN Gg2002/54.

TYPE LOCALITY. ‘Formaciones terciarias de Colchagua’ [Tertiary formations of Colchagua, i.e. Navidad, central Chile].

REMARKS. According to Frassinetti & Covacevich (1984), the specimen available to Hupé was a juvenile. They also remarked that this species is restricted to the Navidad Formation (Navidad Member) in the area surrounding Navidad. They assumed that the material described by Philippi as *Pectunculus colchaguensis* (a name that has since become well established in the literature) was identical to Hupé’s. They incorrectly assumed that the type material was lost (unknown, in their words) so they designated specimen SGO.PI.4156 as the neotype. Such a nomenclatural action cannot be upheld as d’Orbigny’s holotype still exists. In any event, the new species *Glycymeris taverai* Frassinetti & Covacevich (1984: 116–118, figs 8–22) is actually closer to the holotype of *Glycymeris colchaguensis* than the specimens that Frassinetti & Covacevich (1984: 112–114, figs 2–7) referred to Hupé’s species. The latter have more circular shells and the ornamentation seems to be finer too. Unfortunately, the holotype of *Glycymeris colchaguensis* is a closed shell so the interior is not available for comparison; the two taxa illustrated by Frassinetti and Covacevich appear to show differences in the hinge area and internal margins.

coquandi Hupé, 1854 [*Venus*]*Ameghinomya? coquandi* (Hupé, 1854) (Pl. 3, figs 12–14)v*1854 *Venus Coquandii* Hupé: 340–341.1887 *Artemis (Venus) Coquandi* Hupé; Philippi: 109.

TYPE MATERIAL. The holotype is housed in the Typothèque of the Laboratoire de Géologie under number MNHN Gg2002/81.

TYPE LOCALITY. ‘Cerca de Cahuil’ [Near Cahuil, Chile]. This locality name was used by Hupé for several species from around Navidad.

REMARKS. Philippi (1887: 109) placed this species in *Artemis* on the basis of the fact that the anterior end is shorter and narrower than the posterior end. The holotype is a closed shell in which the hinge and interior are not visible, but the shell ornamentation is very similar to that of *Ameghinomya* Ihering, 1907 [type species *Chione argentina* Ihering, 1897].

coquimbensis d’Orbigny, 1842 [*Panopea*]*Panopea coquimbensis* d’Orbigny, 1842 (Pl. 4, fig. 1)v*1842 *Panopæa coquimbensis* d’Orbigny: 126–127, pl. 15, figs 7, 8.1887 *Panopea coquimbensis* D’Orb.; Philippi: 160, pl. 34, fig. 1 (from d’Orbigny).v1969 *Panope coquimbensis* d’Orbigny; Herm: 130, pl. 13, figs 5–6.

TYPE MATERIAL. There are three syntypes in the collections at the MNHN in Paris. One of them is the figured specimen (d’Orbigny 1842: pl. 15, figs 7, 8), housed in the Typothèque of the Laboratoire de Paléontologie under number MNHN A13626. The other two specimens, also internal moulds, are housed in the Typothèque of the Laboratoire de Géologie at the MNHN under numbers MNHN-Gg2005/3 and MNHN-Gg2005/4.

TYPE LOCALITY. ‘... dans les grès tertiaires à gros grains des environs de Coquimbo, au nord du Chili’ [... in the coarse grained Tertiary sands around Coquimbo, in northern Chile].

REMARKS. This species is known only from internal moulds. According to Philippi (1887: 160), he collected several moulds at Coquimbo and one of them showed bits of shell preserved near the umbo, with strong commarginal ribs. Herm (1969) synonymised *P. guayacanensis* Philippi, 1887 with this species and showed how *P. coquimbensis* could be separated from *P. oblonga* Philippi, 1887.

darwinianus d’Orbigny, 1842 [*Pecten*]*Amusium darwinianum* (d’Orbigny, 1842)*1842 *Pecten Darwinianus* d’Orbigny: 133.non 1846 *Pecten Darwinianus* D’Orbig.; Sowerby: 253.non 1846 *Pecten Darwinii*; Sowerby, pl. 3, figs 28–29.1893 *Pecten Darwinianus* D’Orb.; Philippi: 12, pl. 3, fig. 4.1897 *Amusium Darwinianum* (d’Orb.); Ihering: 225–226.1901 *Pecten Darwinianus* D’Orb.; Borchert: 22–24, pl. 2, figs 1–2.1915 *Pecten (Amusium) darwinianum* d’Orbigny; Doello Jurado: 379.

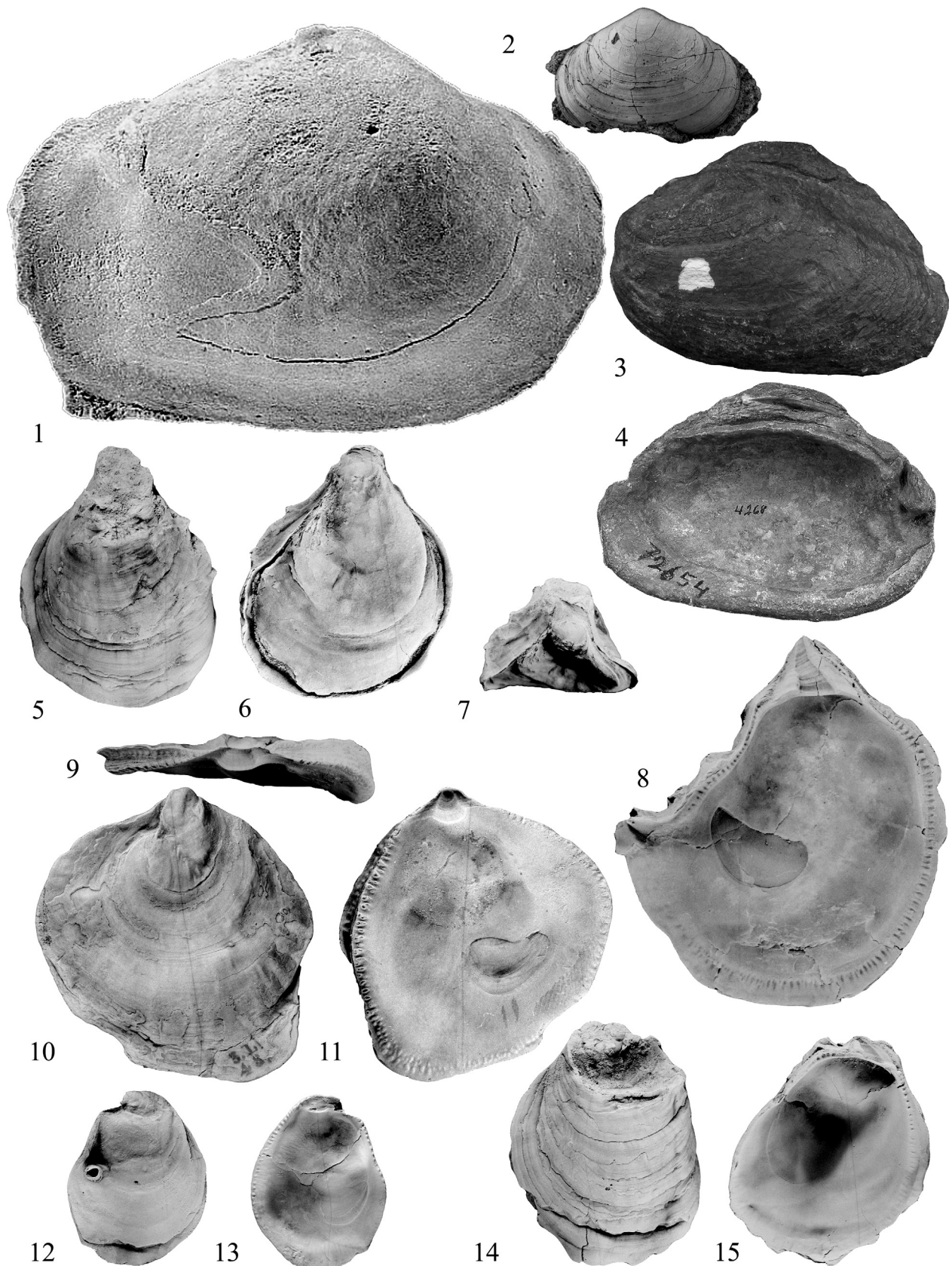


Plate 4 **Fig. 1** *Panopea coquimbensis* d'Orbigny, 1842. Syntype MNHN A13626 (height = 46 mm). **Fig. 2** *Mactra? darwinii* Sowerby, 1846. Syntype NHM-L27977 (height = 25 mm). **Figs 3–4** *Diplodon diluvii* (d'Orbigny, 1842). Neotype Carnegie Museum of Natural History CM 72654 (height = 43 mm). **Figs 5–15** *Ostrea ferrarisi* d'Orbigny, 1842. **5–7**, Syntype MNHN Gg2002/107–1 (height 47 mm). **8**, Syntype MNHN Gg2002/107–2 (height 68 mm). **9–11**, Syntype MNHN Gg2002/107–3 (height 54 mm). **12–13**, Syntype MNHN Gg2002/107–5 (height 30.9 mm). **14–15**, Syntype MNHN Gg2002/107–4 (height 43.6 mm).

- 1967 [1966] *Amusium darwinianum* (d'Orbigny); Camacho: 65 (*partim*; non pl. 9, figs 9a–9b).
 1991 *Amusium darwinianum* (d'Orbigny); del Río: 51–53, pl. 1, fig. 4, pl. 2, fig. 1, pl. 4, figs 2–3.
 v1998b *Amusium darwinianum* (d'Orbigny, 1842); del Río & Martínez Chiappara: 57, pl. 18, fig. 4.
 v 2002 *Amusium darwinianum* (d'Orbigny, 1842); Martínez & del Río, fig. 12.3.

TYPE MATERIAL. There is one specimen in the d'Orbigny Collection at the Laboratoire de Paléontologie under Catalogue Falunien B number 11115 labelled as “*Pecten Darwinianus*”. However, this specimen is not the one mentioned by d'Orbigny in the text, which is a fragment according to him. The specimen in the collection is an almost complete valve of *Zygochlamys actinodes* (Sowerby). A thorough search in the collection of the Laboratoire de Paléontologie and the Laboratoire de Géologie at the MNHN yielded no results. The only fragment, i.e. the holotype, seems to be lost.

TYPE LOCALITY. ‘Grès tertiaires de la Bajada, province d'Entre Ríos’ [Tertiary sand at la Bajada, province of Entre Ríos] (now the city of Paraná). The marine lithostratigraphic unit exposed there is the Paraná Formation.

REMARKS. This is not a *nomen nudum*, as the holotype existed and had a description – albeit brief – and differentiating remarks in the original text by d'Orbigny. A neotype would be required in order to fix the name and avoid confusion with *Amusium paris* del Río (1992: 23–24, pl. 2, figs 3–4; pl. 3, figs 1–2), which was described from rocks of similar age exposed on Valdés Peninsula (Puerto Madryn Formation) and also referred to the late Miocene. However, such an action should wait until additional material from Paraná is collected and properly described.

***darwinii* Sowerby, 1846 [*Mactra*]**

Mactra? darwinii Sowerby, 1846 (Pl. 4, fig. 2)

- v*1846 *Mactra Darwinii* Sowerby: 249, pl. 2, fig. 9.
 v1902 *Mactra* (?) *darwinii* Sowerby; Ortmann: 149–150, pl. 29, fig. 8.

TYPE MATERIAL. Two syntypes are present in the Darwin Collection at the NHM under numbers NHM-L27977 and NHM-L27985.

TYPE LOCALITY. Santa Cruz, Argentina.

REMARKS. The syntype figured by Sowerby (1846: pl. 2, fig. 9) is specimen NHM-L27977, a broken shell in which a small fragment of hinge is visible, but no teeth; the ventral margin is much less complete than suggested by the figure. The other syntype, NHM-L27985, is another poor specimen, a little taller than the figured one, but with the ventral outline and posterior end completely missing. While possibly belonging in *Mactra* Linnaeus, 1767 (type species *Cardium stultorum* Linnaeus, 1758), the generic placement of this species remains uncertain and needs confirmation based on additional topotypic material.

***diluvii* d'Orbigny, 1842 [*Unio*]**

Diplodon diluvii (d'Orbigny, 1842) (Pl. 4, figs 3–4)

- *1842 *Unio diluvii* d'Orbigny: 127, pl. 7, figs 12–13.

- 1969 *Diplodon diluvii* (d'Orbigny); Parodiz: 73, pl. 9, fig. 2.

TYPE MATERIAL. The type material is presumably lost as it could not be located in collections at the MNHN in Paris. A neotype was designated and figured by Parodiz (1969) and it is housed in the Carnegie Museum of Natural History, Section of Molluscs, under number CM 72654. It comes from the lower Pliocene of the Colorado River, Río Negro Province.

TYPE LOCALITY. ‘...au sein des terrains tertiaires de la Barranca del Norte (falaises du nord), près du Río Negro, en Patagonie’ [... within the Tertiary beds of Barranca del Norte (northern banks), near Río Negro, in Patagonia].

REMARKS. The type material apparently consisted of an internal mould. According to d'Orbigny (1842: 127), he found this species below all the Tertiary oyster-bearing sands of Patagonia, a fact that seems highly unlikely. Parodiz (1969) found it in the lower Pliocene of the Colorado River, north of the Río Negro.

***elegans* Hupé, 1854 [*Nucula*]**

Tindaria sulculata (Gould, 1852) (Pl. 5, figs 3–5)

- *1852 *Nucula sulculata* Gould: 434, pl. 37, figs 539a–539e.
 v1854 *Nucula elegans* Hupé: 305, pl. 5, fig. 7.
 1856 *Leda lugubris*; A. Adams: 49.
 v1887 *Nucula elegans* Hupé; Philippi: 189, pl. 31, fig. 6.
 1889 *Leda orangica*; Mabilie & Rochebrune: 113, pl. 8, fig. 3.
 1942 *Leda elegans* (Hupé); Tavera: 614.
 1960 *Tindaria (Tindariopsis) sulculata*; Powell: 171.
 1964 *Tindariopsis? sulculata*; Dell: 149.
 1971 *Nuculana sulculata*; Dell: 167, pl. 1, figs 1–4, pl. 2, fig. 9.
 1983 *Tindaria sulcata*; Bernard: 11 (synonymy).
 v1995 *Nuculana elegans* (Hupé, 1854); Frassinetti & Covacevich: 51. text-fig. 3a, pl. 1, figs 1–5.
 v1997 *Nuculana elegans* (Hupé, 1854); Frassinetti: 60. pl. 1, figs 5–7.
 1998 *Tindariopsis sulculata* (Gould, 1852, ex Couthouy MS); Villarroel & Stuardo: 144, figs 1c, 39–40, 80–82, 157–159.
 1998 *Tindariopsis elegans* (Hupé, 1854); Villarroel & Stuardo: 168, figs 2, 148–156.

TYPE MATERIAL. Several syntypes of *Nucula elegans* Hupé, 1854, in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/56.

TYPE LOCALITY. According to Hupé (1854), the syntypes of *Nucula elegans* come from the Eocene formations of Coquimbo (‘Formaciones Eocenas de Coquimbo’), but they are originally labelled as coming from Arauco. Catalogue 8P also states ‘Arauco. Tufa à grains grossiers, jaunâtre, contenant des coquilles marines’ [Arauco. Coarse grained yellowish tuffs containing marine shells]. Because of our own data we are certain that the label and catalogue are correct and the material comes from the Pliocene Tubul Formation of Península Arauco.

REMARKS. The name used by Hupé (1854) is commonly accepted as a synonym of *Nucula sulculata*. However,

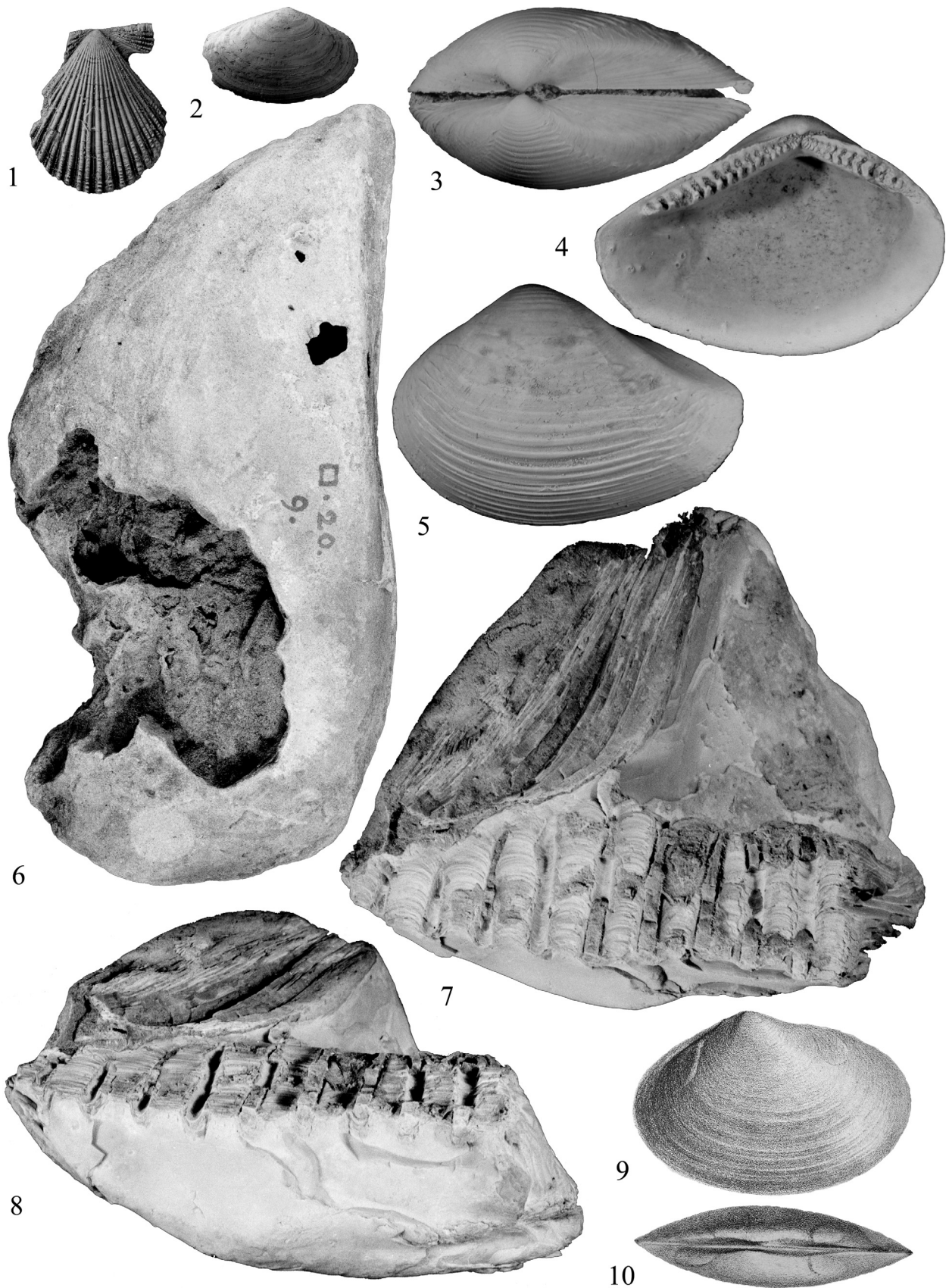


Plate 5 **Fig. 1** *Zygochlamys geminata* (Sowerby, 1846). Holotype NHM-L27695 (height = 30.7 mm). **Fig. 2** *Scalpomactra glabra* (Sowerby, 1846). Holotype NHM-L27966 (height = 17.4 mm). **Figs 3–5** *Tindaria sulculata* (Gould, 1852). Syntypes of *Nucula elegans* Hupé, 1854, MNHN-Gg2002/56. **3**, height = 7.3 mm. **4–5**, height = 7.4 mm. **Figs 6–8** *Isognomon gaudichaudi* (d'Orbigny, 1842). **6**, Syntype MNHN Gg2002/122 (height = 279 mm). **7**, Syntype MNHN Gg2002/121 (height = 105 mm). **8**, Same specimen as **7**, but slightly tilted. **Figs 9–10** '*Solenocurtus*' *hanetianus* d'Orbigny, 1842, from pl. 15, figs 1 & 2 of d'Orbigny.

Villarroel & Stuardo (1998) separated fossil and extant species by small differences in shell shape and ornamentation, while S.N.N. & C. Valdovinos (unpublished results) could not confirm these differences based on the the same material. According to Philippi (1887) this species was also found at Coquimbo and at Tubul by Volckmann. As correctly pointed out by Frassinetti & Covacevich (1995: 51), the species is known as a fossil only from Tubul and Isla Guambín, and Hupé's mention of Coquimbo is, as discussed above, erroneous. Localities and ages cited by Villarroel & Stuardo (1998) apparently were taken uncritically from the literature, because there is no Eocene exposed near Coquimbo, nor is there Palaeocene near Navidad. This species is not known from the Miocene deposits of Navidad, Arauco or Chiloé (our unpublished results).

ferrarisii d'Orbigny, 1842 [*Ostrea*]

Crassostrea patagonica (d'Orbigny, 1842) (Pl. 4, figs 5–15)

v1842 *Ostrea Ferrarisii* d'Orbigny: 134, pl. 7, figs 17, 18.
non 1907 *Ostrea Ferrarisii* Orb.; Ihering: 405–406.

non 1969 *Ostrea (Ostrea) ferrarisii* d'Orbigny; Herm: 111–112, pl. 6, fig. 4, pl. 7, fig. 1.

TYPE MATERIAL. There are 17 syntypes of this species in the Typothèque of the Laboratoire de Géologie under number MNHN Gg2002/107. One of them is the specimen figured by d'Orbigny (1842: pl. 7, figs 17, 18).

TYPE LOCALITY. '...au sein des couches inférieures des terrains tertiaires de Patagonie, dans un grès verdâtre, qui découvre a marée basse, aux Barrancas du Sud, rive gauche de l'embouchure du Río Negro' [... within the lower beds of the Patagonian Tertiary terrains, in a greenish sand exposed during low tide, at Barrancas del Sud, left bank of the mouth of the Río Negro (northern Patagonia)].

REMARKS. This species is based on juvenile specimens of '*Ostrea patagonica* d'Orbigny, 1842 (see below). In the d'Orbigny Collection in the Laboratoire de Paléontologie at the MNHN in Paris, there is an entry in Catalogue Falunien B that reads '*Ostrea Ferrasi*' under number 11141 (now MNHN-A14085). This specimen is the figured specimen (and holotype) of '*Ostrea alvarezii* d'Orbigny, 1842, and it has certainly been misplaced in the collection.

Herm's (1969: 112) claim that this species appears in Pliocene–Pleistocene rocks from northern Chile is incorrect. The specimens illustrated by him are all juveniles of *Crassostrea transitoria* (Hupé), the common large oyster from the Neogene of central and northern Chile. In his synonymical list of *Ostrea (Ostrea) ferrarisii* he also included *Ostrea alvarezii* d'Orbigny, a clearly distinct species from northern Patagonia. The specimen illustrated by d'Orbigny is a juvenile of '*Ostrea patagonica* d'Orbigny (see entry under *patagonica* d'Orbigny, 1842 [*Ostrea*], below).

gaudichaudi d'Orbigny, 1842 [*Perna*]

Isognomon gaudichaudi (d'Orbigny, 1842) (Pl. 5, figs 6–8)

v*1842 *Perna Gaudichaudi* d'Orbigny: 131, pl. 15, figs 14–16.

1855 *Perna chilensis* Conrad: 285, pl. 42, fig. 7 (as *Perna chiliana*).

1887 *Melina (Perna) Gaudichaudi* D'Orb.; Philippi: 200, pl. 45, figs 2, 3 (fig. 2 from d'Orbigny).

?1887 *Melina pusilla* Philippi: 201, pl. 45, fig. 5.

TYPE MATERIAL. The two syntypes were found in the Gaudichaud Collection of the Laboratoire de Géologie at the MNHN in Paris. They are now housed in the Typothèque there under numbers MNHN Gg2002/121 and MNHN Gg2002/122.

TYPE LOCALITY. '... dans le grès tertiaire compact des environs de Coquimbo, au nord du Chili' [... in the compact Tertiary sand around Coquimbo, in northern Chile].

REMARKS. One of the syntypes, MNHN Gg2002/122 is the large specimen illustrated by d'Orbigny (1842: pl. 15, figs 14, 15). The figure is very stylised, as the shell ornamentation is not visible. Probably d'Orbigny assumed it was present, as is the case for many members of the group. The other specimen, MNHN Gg2002/121, is the figured fragment of hinge (d'Orbigny 1842: pl. 15, fig. 16).

According to Philippi (1887: 200) this species is found at Coquimbo (where Gaudichaud found it) and also at Guayacán and Caldera. He wondered whether Gaudichaud had been luckier than himself, with reference to the fact that he had found a complete specimen. However, the large specimen collected by Gaudichaud is an internal mould and the ornamentation is a stylisation by d'Orbigny. The species clearly belongs in *Isognomon* Lightfoot, 1786 (type species *Ostrea perna* Linnaeus, 1767). It is also found at the southern tip of Bahía Herradura de Mejillones (our unpublished data). '*Melina pusilla* Philippi, 1887 (p. 201, pl. 45, fig. 5) is a small specimen from Matanzas. According to Philippi it is not a juvenile of *Isognomon gaudichaudi*, but this needs confirmation. Matanzas is general Navidad age, i.e. late Miocene to early Pliocene (Finger *et al.* 2007), but Frassinetti & Covacevich (1993) noted that *Melina pusilla* was not found at Matanzas.

Perna chilensis Conrad, 1855, from the Miocene near Caldera is a junior synonym.

geminatus Sowerby, 1846 [*Pecten*]

Zygochlamys geminata (Sowerby, 1846) (Pl. 5, fig. 1)

v*1846 *Pecten geminatus* Sowerby: 252, pl. 2, fig. 24.

v1907 *Myochlamys geminata* (Sow.); Ihering: 254–255.

?1985 *Zygochlamys dominator* n. sp.; Morra: 303–304, pl. 2, figs 1a–1b.

v1999 *Zygochlamys geminatus* (Sowerby, 1846) [sic]; Frassinetti & Covacevich: 24, pl. 3, figs 10–11, pl. 4, figs 2–4.

2004b *Zygochlamys geminata*; del Río: fig. 9.5.

TYPE MATERIAL. Holotype: NHM-L27695.

TYPE LOCALITY. 'San Julian, Patagonia'. As pointed out by Morra (1985: 302), the exact locality is uncertain.

REMARKS. The holotype is a juvenile right valve. Morra (1985: 302) correctly pointed out that, as the exact locality and stratigraphical horizon from whence the holotype came are not clear, and many other species of *Zygochlamys* share the geminate ribs on young specimens, the name should be left in suspense. However, an adequate suite of specimens of all stages of other species of this genus confirms that the

species is valid, and *Zygochlamys dominator* Morra, 1985 (p. 303–304, pl. 2, figs 1a–b) is the adult stage. Sowerby's illustration (Sowerby 1846: pl. 2, fig. 24) is fairly accurate, but does not show the costae as clearly arranged in pairs as in the specimen itself. It has eight pairs of costae plus one largish posterior one and two largish anterior ones, with one very fine secondary costa in each radial interspace in *between* the pairs. Therefore, *Zygochlamys dominator* is a junior synonym of *Zygochlamys geminata*. *Pecten geminatus* is the type species of *Zygochlamys* Ihering, 1907.

***glabra* Sowerby, 1846 [*Nucula*?]**

Scalpomactra glabra (Sowerby, 1846) (Pl. 5, fig. 2)

v*1846 *Nucula* ? *glabra* Sowerby: 251, pl. 2, fig. 18.

non 1897 *Nucula* ? *glabra*; Ihering: pl. 4, fig. 24, pl. 5, fig. 31.

non 2004b *Pseudoportlandia glabra* (Sowerby, 1846); del Río: fig. 12.6.

TYPE MATERIAL. Holotype: NHM-L27966.

TYPE LOCALITY. Santa Cruz, Argentina.

REMARKS. Sowerby's figure is not a nuculid. The hinge of the only specimen is not shown, but all other characters agree well with a small species of *Scalpomactra* Finlay in Marwick, 1928 (type species *Mactra scalpellum* Reeve, 1854) very abundant in the Monte León Formation and collected by us at the type locality. The species is thus referred to *Scalpomactra*. The specimen described by Ihering (1897: 244, pl. 4, fig. 24 and pl. 5, fig. 31) as *Leda glabra* Sowerby is something entirely different, possibly close to *Pseudoportlandia* Woodring, 1925 (type species *Leda clara* Guppy, 1873). The specimen figured by del Río (2004b: fig. 12.6) as *Pseudoportlandia glabra* (Sowerby, 1846) also belongs to Ihering's species and not to that of Sowerby, confirming our supposed generic placement of that species.

***hanetianus* d'Orbigny, 1842 [*Venus*]**

Retrotapes hanetianus (d'Orbigny, 1842) (Pl. 6, figs 1–6)

v*1842 *Venus Hanetiana* d'Orbigny: 123, pl. 13, figs 3–6.

1887 *Venus Hanetiana* D'Orb.; Philippi: 124–125, pl. 22, fig. 1.

v1969 *Eurhomalea hanetiana* (d'Orbigny); Herm: 127, pl. 12, figs 12–14.

TYPE MATERIAL. Apparently there were originally at least three syntypes. Two syntypes (both from Coquimbo) are in the Typothèque of the Laboratoire de Paléontologie, under numbers MNHN-R09523 (d'Orbigny Collection 10891) and MNHN-A13722 (d'Orbigny Collection 10891A), and both are unidentifiable internal moulds.

TYPE LOCALITY. '... dans le grès tertiaire à gros grains des environs de Coquimbo, au nord du Chili' [In the coarse Tertiary sandstone from around Coquimbo, in northern Chile], collected by M. Hanet Clery.

REMARKS. In addition to the two syntypes housed in the Typothèque of the Laboratoire de Paléontologie, the only material associated with this name is in the d'Orbigny Collection, also in the Laboratoire de Paléontologie, in a bag labelled 'manque 10891 et 10892'. The specimen itself is labelled '*Venus hanetiana*? D'Orb. Coquimbo. Falunien B.

10891A', and on the back of the label, 'coll. D'Orbigny, 10891A'. This specimen is an internal mould, but is not the specimen figured by d'Orbigny (1842: pl. 13, figs 3, 4) nor the one he figured as *Venus incerta* (d'Orbigny 1842: pl. 13, figs 5, 6), although the question mark on the label suggests it may be a specimen of *incerta*. Herm (1969: 127, pl. 12, figs 12–14) described and illustrated material he referred to this species, synonymising *Venus hupeana* Philippi, 1887 (p. 132, pl. 26, fig. 1) with d'Orbigny's taxon. He included it in *Eurhomalea* Cossmann, 1920 (type species *Venus rufa* Lamarck, 1818), but his material clearly belongs in *Retrotapes* del Río, 1997. Frassinetti (1974: 44) also synonymised these two species but did not state the criteria he used for doing so.

***hanetianus* d'Orbigny, 1842 [*Solenocurtus*]**

'*Solenocurtus*' *hanetianus* d'Orbigny, 1842 (Pl. 5, figs 9–10)

*1842 *Solenocurtus Hanetianus* d'Orbigny: 124–125, pl. 15, figs 1, 2.

1887 *Psammobia Hanetiana* (*Solenocurtus*) D'Orb.; Philippi: 137, pl. 32, fig. 1.

TYPE MATERIAL. The type material of this species was not located in any of the Collections at the MNHN in Paris. It is presumably lost.

TYPE LOCALITY. '... au sein des grès tertiaires à gros grains de Coquimbo, au nord du Chili' [... within the coarse grained Tertiary sands from Coquimbo, in northern Chile].

REMARKS. According to Philippi (1887: 137) this species cannot be included in *Solenocurtus* [sic] as it has a shell closed at both ends. However, the figure shows an unidentifiable mould. The name must remain a *nomen dubium*.

***insolita* Sowerby, 1846 [*Trigonocelia*]**

Limopsis insolita (Sowerby, 1846) (Pl. 7, figs 1–2)

v*1846 *Trigonocelia insolita* Sowerby: 252, pl. 2, figs 20, 21.

v1902 *Limopsis insolita* (Sowerby); Ortmann: 91, pl. 25, fig. 6.

1998 *Limopsis* (*Limopsis*) *insolita* (Sowerby); del Río & Camacho: 76–77, pl. 1, figs 10–11.

v1999 *Limopsis insolita* (Sowerby, 1846); Frassinetti & Covacevich: 20, pl. 2, fig. 20.

TYPE MATERIAL. Syntypes: NHM-L27963 (Santa Cruz), NHM-L27957, NHM-L27958 and NHM-L27959 (Santa Cruz).

TYPE LOCALITY. Santa Cruz, Patagonia.

REMARKS. The interior of syntype NHM-L27957 was illustrated by Sowerby (1846: pl. 2, fig. 20), while the figured exterior is that of the incomplete left valve on the slab numbered NHM-L27963 (Sowerby 1846: 252, pl. 2, fig. 21).

Del Río & Camacho (1998: 77) mentioned that 'the holotype of this species consists of a left valve found by Darwin in the lowermost horizons of the Monte León Formation at the mouth of the Santa Cruz River'. They were obviously unaware that the two figures on Sowerby's plate showed two different specimens. As the specimens illustrated are clearly different, their lectotype designation by inference

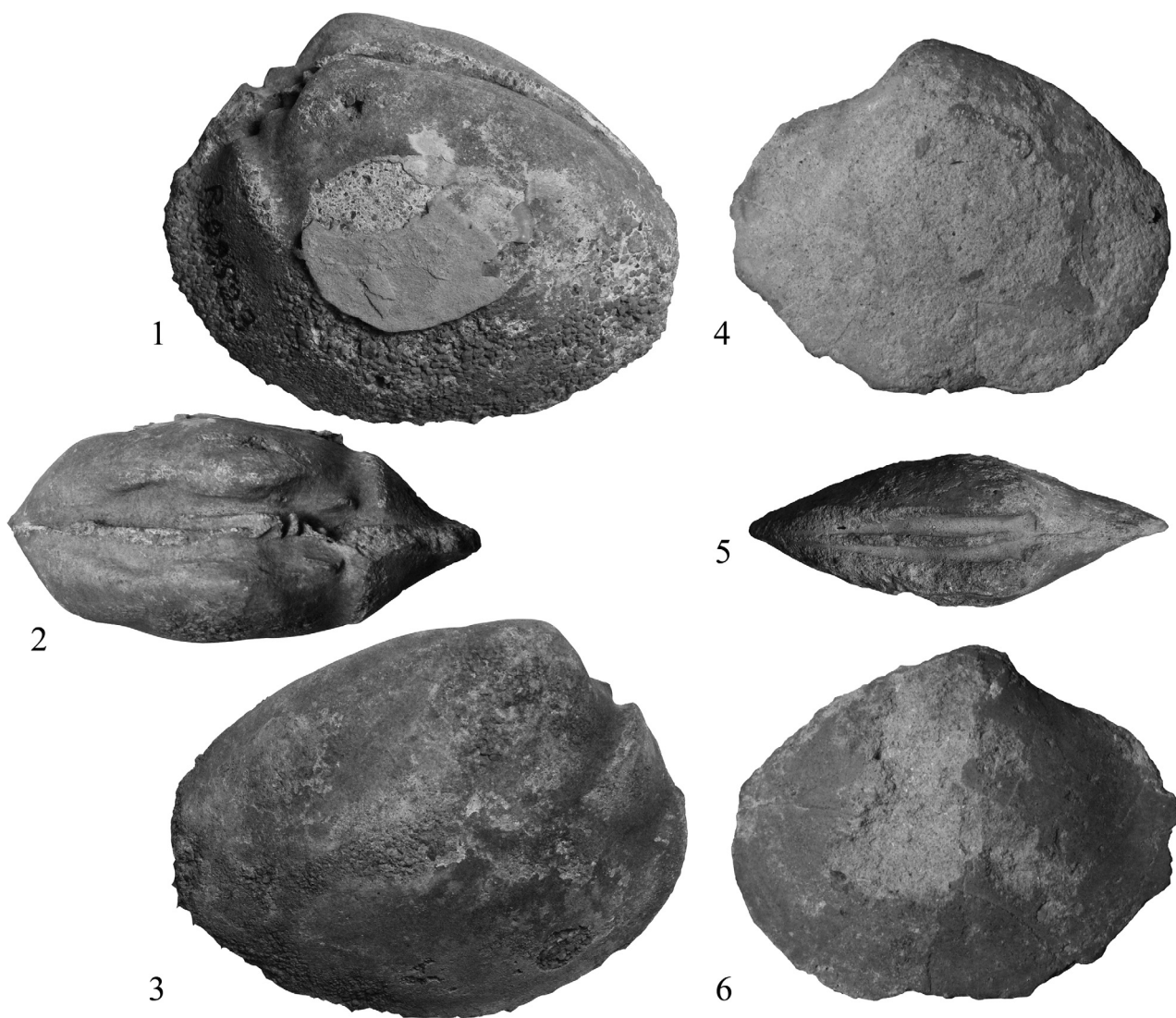


Plate 6 Figs 1–6 *Retrotapes hanetianus* (d'Orbigny, 1842). 1–3, Syntype MNHN-A13722 (height = 51 mm). 4–6, Syntype MNHN-R09523 (height = 60 mm).

of holotype is invalid (ICZN 1999: Art. 74.5). In any event, this is the only species of *Limopsis* in the Monte León Formation. Therefore, a lectotype designation appears, at present, unnecessary.

***insulsa* Hupé, 1854 [*Venus*]**

'*Venus*' *insulsa* Hupé, 1854 (Pl. 7, figs 5–7)

v*1854 *Venus insulsa* Hupé: 343, pl. 6, fig. 10.

1887 *Venus insulsa* Hupé; Philippi: 111, pl. 57, fig. 6.

TYPE MATERIAL. The holotype is housed in the Typothèque of the Laboratoire de Géologie under number MNHN Gg2002/62.

TYPE LOCALITY. 'Isla de Quiriquina' [Quiriquina Island, Chile].

REMARKS. The exact locality from where the holotype comes is unknown. Therefore, the age is uncertain as rocks exposed in Quiriquina range in age from the Maastrichtian through to the Tertiary. The holotype is a closed shell and

thus the interior is not available for study. This hampers any attempt at generic placement. Philippi (1887: 111, pl. 57, fig. 6) reported a specimen from Lebu, where the exposures are probably Eocene. However, its identity with Hupé's species is uncertain.

***laevigata* Sowerby, 1846 [*Corbis*?**

Lahillia laevigata (Sowerby, 1846) (Pl. 7, figs 8–11)

v*1846 *Corbis* ? *laevigata* Sowerby: 250, pl. 2, fig. 11.

1887 *Fimbria* (*Corbis*) *laevigata* Sow.; Philippi: 176, pl. 33, fig. 4 (from Sowerby).

1887 *Amathusia angulata* Philippi: 130, pl. 23, fig. 1, pl. 25, fig. 1.

1899a *Theringia* [sic] *angulata* (Phil.); Cossmann: 45 (err. pro *Iheringia* Cossmann, 1899 non Keyserling, 1891).

TYPE MATERIAL. Holotype: NHM-L27687 (Navidad).

TYPE LOCALITY. Navidad, Navidad Formation, Miocene, Central Chile.

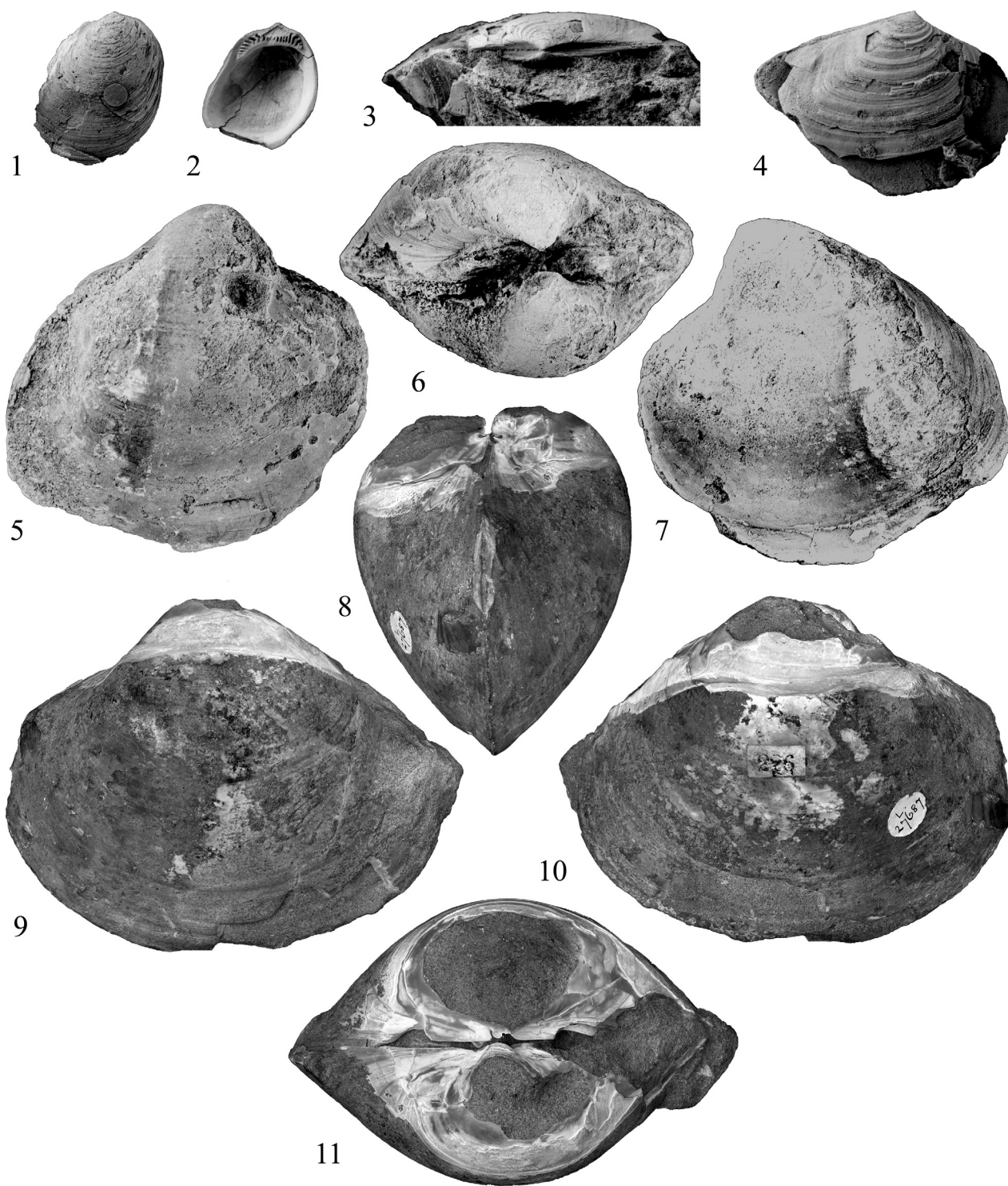


Plate 7 Figs 1–2 *Limopsis insolita* (Sowerby, 1846). 1, Syntype NHM-L27963 (height = 25.5 mm). 2, Syntype NHM-L27957 (height = 21 mm). Figs 3–4 *Spissatella lyellii* (Sowerby, 1846). Holotype NHM-L27967 (height = 31 mm). Figs 5–7 '*Venus*' *insulsa* Hupé, 1854. Holotype MNHN Gg2002/62 (height = 57 mm). Figs 8–11 *Lahillia laevigata* (Sowerby, 1846). Holotype NHM-L27687 (height = 63.5 mm).

REMARKS. The holotype is an articulated but extremely poor specimen, with only a little shell remaining around umbo and hingeline. Despite the poor state of preservation, it is clearly a senior synonym of *Amathusia angulata* Philippi, 1887. *Amathusia angulata* is the type species of *Lahillia* Cossmann, 1899, a replacement name for *Iheringia*

Cossmann, 1899 (accidentally spelled *Theringia* in Cossmann 1899a as stated in Cossmann 1899b), not *Iheringia* Lahille, 1898 (also accidentally printed *Theringia*, in Lahille, 1899) nor *Iheringia* Keyserling, 1891. *Iheringia* Cossmann, 1899 itself is a replacement name for *Amathusia* Philippi, 1887, which was already three times occupied

(Cossmann, 1899a). Philippi (1887: 176) stated that he had not seen Sowerby's shell. Nevertheless he included it in *Fimbria* Megerle von Mühlfeld, 1811 (type species *Fimbria magna* = *Venus fimbriata* Linnaeus, 1758), a genus belonging in an entirely different group.

lyellii Sowerby, 1846 [*Crassatella*]

Spissatella lyellii (Sowerby, 1846) (Pl. 7, figs 3–4)

- v*1846 *Crassatella Lyellii* Sowerby: 249, pl. 2, fig. 10.
- v1900 *Crassatella quarta* sp. nov.; Ortmann: 371.
- v1902 *Crassatellites quartus* (Ortmann); Ortmann: 124, pl. 27, fig. 1.
- 1907 *Crassatellites Lyelli* (Sow.); Ihering: 278.
- 2004b *Spissatella lyelli* (Sowerby, 1846); del Río: figs 10.13, 10.14.

TYPE MATERIAL. Holotype: NHM-L27967.

TYPE LOCALITY. Santa Cruz, Patagonia.

REMARKS. The holotype figured by Sowerby (1846: pl. 2, fig. 10) is a very weakly inflated articulated pair. Topotypic material from Santa Cruz indicates that this species fits well in *Spissatella* Finlay, 1926 (type species *Crassatella trailli* Hutton, 1873). It is far less complete than suggested by Sowerby's figure. A well preserved specimen from the mouth of the Santa Cruz River was figured by del Río (2004b).

maxima Hupé, 1854 [*Ostrea*]

Crassostrea transitoria (Hupé, 1854) (Pl. 8, figs 1–3, Pl. 9, figs 1–3)

- v1854 *Ostrea maxima* Hupé: 382–383, pl. 4, fig. 1 (junior primary homonym of *O. maxima* Linnaeus, 1758).
- v*1854 *Ostrea transitoria* Hupé: 283, pl. 4, fig. 3.
- v1854 *Ostrea rostrata* Hupé: 283.
- 1896 *Ostrea transitoria* Hup.; Möricke: 576.
- 1896 *Ostrea Beneckeii* nov. sp.; Möricke: 574, pl. 13, fig. 1.
- v1969 *Ostrea (Crassostrea) maxima* Hupé; Herm: 113–114, pl. 6, figs 1–2.
- v1969 *Ostrea (Ostrea) transitoria* Hupé; Herm: 113, pl. 7, figs 5–6.
- v1969 *Ostrea (Ostrea) longiuscula* Hupé; Herm: 112–113, pl. 7, figs 2–4.

TYPE MATERIAL. Five syntypes are housed in the Typothèque of the Laboratoire de Géologie (Catalogue 8P) under numbers MNHN-Gg2002/88 (four syntypes) and MNHN-Gg2002/89 (one syntype, 259 mm).

TYPE LOCALITY. 'Formaciones Terciarias de Coquimbo' [Tertiary formations of Coquimbo].

REMARKS. All five syntypes of *Ostrea maxima* are large adults of this species and in various states of preservation. The illustration of Hupé (1854: pl. 4, fig. 1) is a composite of at least two of the specimens. *Ostrea transitoria* Hupé, 1854 (p. 283, pl. 4, fig. 3) and *Ostrea rostrata* Hupé, 1854 (p. 283) are based on juvenile specimens of *Crassostrea maxima*, a fact that becomes evident after examining a large suite of specimens from the type locality near Coquimbo. Since the name *Ostrea maxima* is a junior primary homonym of *O. maxima* Linnaeus, 1758 (type species of *Pecten* Müller, 1776) and *O. transitoria* is the first available synonym, this

latter name must be used for this species. As first revisers, we select the name *Crassostrea transitoria* as the one to be used for the species named *O. maxima*, *O. transitoria* and *O. rostrata* by Hupé (1854).

meridionalis Sowerby, 1846 [*Venus*]

Ameghinomya meridionalis (Sowerby, 1846) (Pl. 8, fig. 4)

- v*1846 *Venus meridionalis* Sowerby: 250, pl. 2, fig. 13.
- 1887 *Venus meridionalis* Sow.; Philippi: 115, pl. 15, fig. 5.
- v1902 *Chione meridionalis* (Sow.); Ortmann: 137, pl. 27, figs 11a, b.
- v1907 *Chione meridionalis* (Sow.); Ihering: 309, pl. 12, fig. 79.
- 1974 *Chione meridionalis* (Sowerby); Frassinetti: 48, fig. 8.
- 1994 *Ameghinomya meridionalis* (Sowerby); del Río: 120, pl. 3, figs 6–10.
- v1999 *Chione* cf. *meridionalis* (Sowerby, 1846); Frassinetti & Covacevich: 39, pl. 7, figs 7–8.

TYPE MATERIAL. Lectotype (designated herein): NHM-L27980 (Santa Cruz); paralectotypes: NHM-L27973 (Santa Cruz), NHM-L27981 (Santa Cruz), NHM-L27999 (Navidad). The status of the specimen from Navidad is uncertain and it is probably not conspecific with the three syntypes from Santa Cruz. Del Río (1994) apparently assumed that the illustrated specimen was the 'holotype', not being aware that Sowerby's figure is a composite. Her statement is not valid as a lectotype designation (ICZN 1999: Art. 74.5). However, in order to stabilise the nomenclature of this species, we follow common usage and designate specimen NHM-L27980 as lectotype.

TYPE LOCALITY. Darwin stated Santa Cruz, Argentina and Navidad, Chile. Designation of syntype NHM-L27980 as lectotype restricts the type locality of this species to Santa Cruz.

REMARKS. Sowerby (1846) also noted Navidad as the locality, although remarking that the best specimens came from Santa Cruz. According to Philippi (1887), this species resembles more closely *Venus discrepans* Sowerby (living off the Chilean coast) than *Venus exalbida* Dillwyn, 1817 (= *Samarangia* = *Retrotapes*), to which it had been compared by d'Orbigny (1852). Del Río (1994: 120) showed that it belongs in *Ameghinomya* Ihering, 1907 (type species *Venus volckmanni* var. *argentina* Ihering, 1897).

multiradiatum Sowerby, 1846 [*Cardium*]

Trachycardium? multiradiatum (Sowerby, 1846) (Pl. 9, fig. 4)

- v*1846 *Cardium multiradiatum* Sowerby: 251, pl. 2, fig. 16.
- 1887 *Cardium multiradiatum* Sow.; Philippi: 171, pl. 38, fig. 3.

TYPE MATERIAL. Holotype: NHM-L27965 (Navidad).

TYPE LOCALITY. Navidad, Navidad Formation, Miocene, Central Chile.

REMARKS. The holotype is a fairly large but highly incomplete – possibly posterior – half of a valve of generalised *Trachycardium* type.

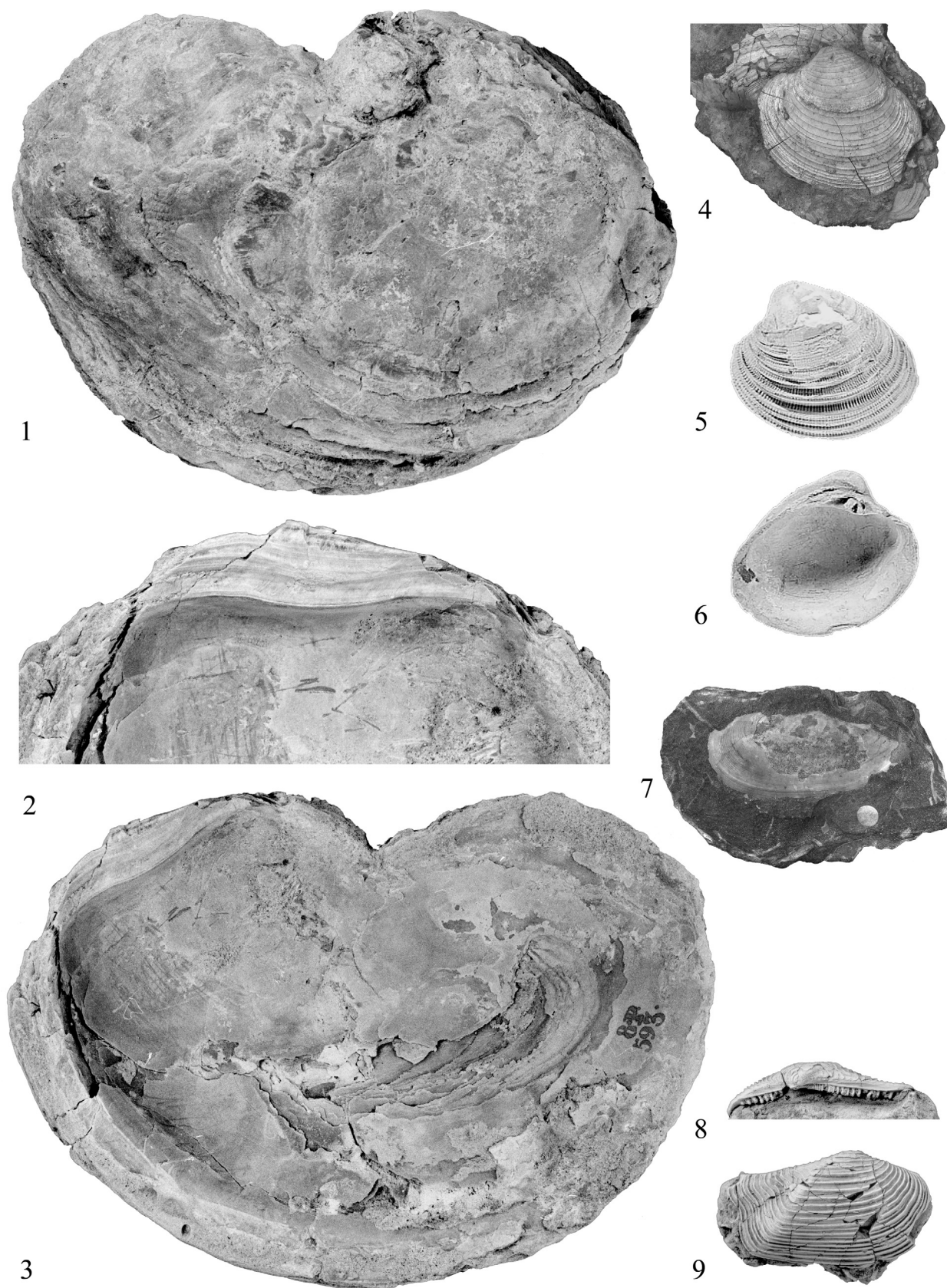


Plate 8 Figs 1–3 *Crassostrea transitoria* (Hupé, 1854). Syntype of *Ostrea maxima* Hupé, 1854 MNHN-Gg2002/88-1 (maximum diameter = 216.7 mm). **Fig. 4** *Ameghinomya meridionalis* (Sowerby, 1846). Lectotype NHM-L27980 (height = 28.6 mm). **Figs 5–6** *Chionopsis munsterii* (d'Orbigny, 1842). Syntype MNHN-A13718 (height = 28 mm). **Fig. 7** *Tellinella? oblonga* (Sowerby, 1846). Holotype NHM-L27961 (length of slab = 53.5 mm). **Figs 8–9** *Neilo ornata* (Sowerby, 1846). Lectotype NHM-L27974 (height = 21.1 mm).

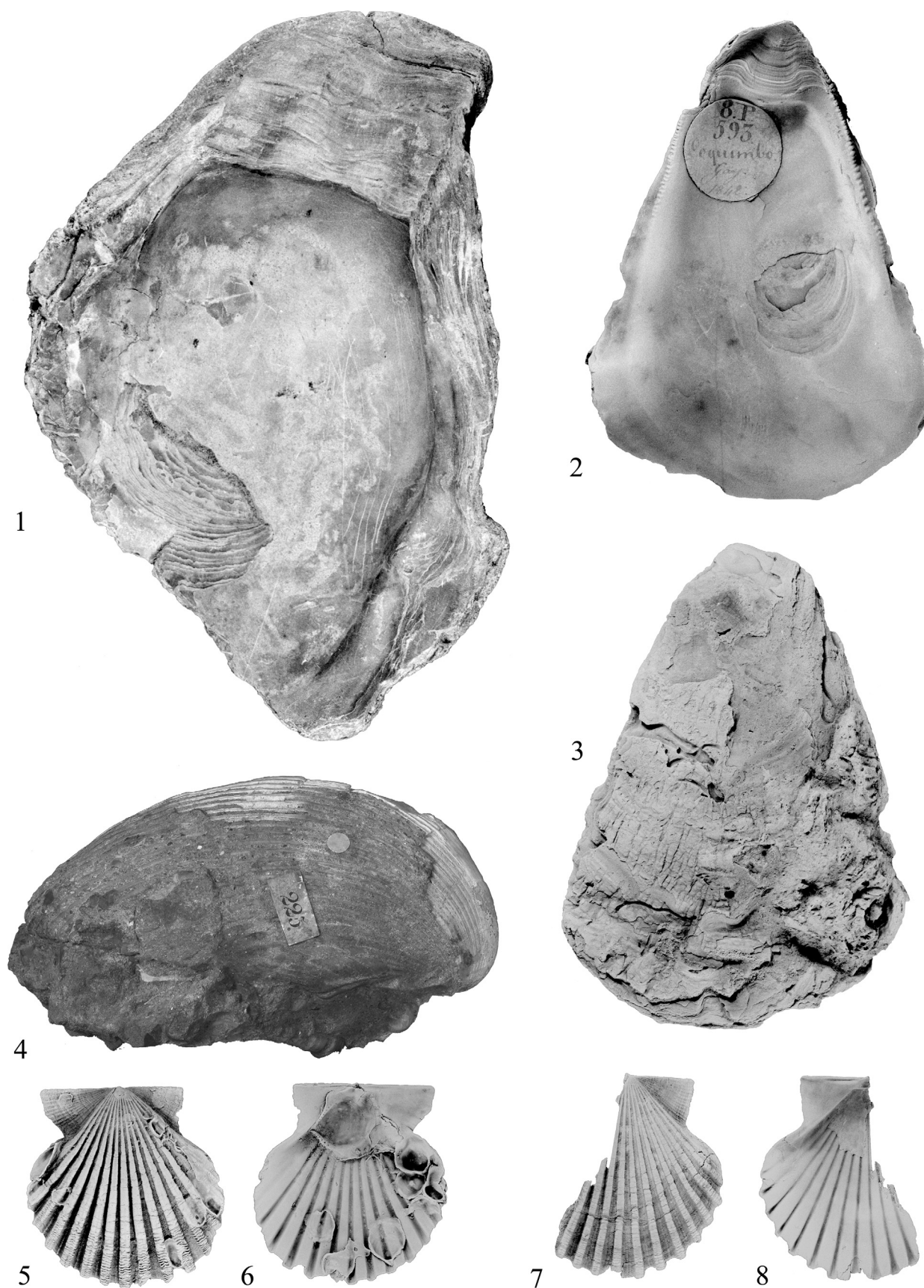


Plate 9 Figs 1–3 *Crassostrea transitoria* (Hupé, 1854). 1, Syntype of *Ostrea maxima* Hupé, 1854 MNHN-Gg2002/89 (height = 259 mm). 2–3, Syntype of *Ostrea Maxima* MNHN-Gg2002/88–2 (height = 86 mm). Fig. 4 *Trachycardium? multiradiatum* (Sowerby, 1846). Holotype NHM-L27965 (height = 86.9 mm). Figs 5–8 *Chesapeecten patagonensis* (d'Orbigny, 1842). 5–6, Syntype MNHN-Gg2002/110–1 (height = 36 mm). 7–8, Syntype MNHN-Gg2002/110–2 (height = 36.4 mm).

Philippi (1887) stated that he had available good specimens from Navidad and also from Curauma and Santa Cruz. The specimens from Santa Cruz are all external moulds, except for a small specimen probably belonging in *Hedecardium? puelchum* (Sowerby).

***munsterii* d'Orbigny, 1842 [*Venus*]**

Chionopsis munsterii (d'Orbigny, 1842) (Pl. 8, figs 5–6)

v*1842 *Venus Munsterii* d'Orbigny: 121–122, pl. 7, figs 10–11.

1852 *Cardium Munsterii*, d'Orb.; d'Orbigny: 120.

?1893 *Venus pacheia* Philippi: 10, pl. 1, fig. 2.

1897 *Venus Muensteri* d'Orb.; Ihering: 330–331.

1907 *Chione Muensteri* (Orb.); Ihering: 386.

1939 *Chione Münsteri*, d'Orb.; Wahnish: 153, pl. 1, figs 3a–3b.

1967 [1966] *Chione münsteri* (d'Orbigny); Camacho: 83, pl. 12, fig. 10.

1991 *Chionopsis (Chionopsis) münsteri* (d'Orbigny); del Río: 69–70, pl. 4, fig. 6, text fig. 25.

1998b *Chionopsis (Chionopsis) muensterii* (d'Orbigny, 1842); del Río & Martínez Chiappara: 77, pl. 14, figs 8–9, pl. 20, figs 5–6, pl. 26, figs 2–3.

2000 *Chionopsis münsteri*; del Río: figs 11.5, 11.6.

2002 *Chionopsis munsterii* (d'Orbigny, 1842); Martínez & del Río: fig. 12.9.

TYPE MATERIAL. Four syntypes are housed in the Typothèque of the Laboratoire de Paléontologie. These are numbered MNHN-A13718 (one shell and two internal moulds) and MNHN-A13719 (one shell, lectotype, designated herein), both from Bajada; one syntype numbered MNHN-A13720, labelled Santa Fé; one syntype numbered MNHN-A13721 from St. Joseph. Two additional syntypes are housed in the Typothèque of the Laboratoire de Géologie under numbers MNHN-Gg2005/5 and MNHN-Gg2005/6.

TYPE LOCALITY. 'La Bajada, Entre Ríos; entre l'embouchure du Río Negro et Ensenada de Ros, Patagonie' [La Bajada, Entre Ríos (nowadays the city of Paraná); between the mouth of the Río Negro and Ensenada de Ros, province of Río Negro].

REMARKS. D'Orbigny's original figure seems to be a composite of two of the syntypes numbered MNHN-A13718 and MNHN-A13719 (the two that have been glued to a tablet), as shown by the size of fig. 11, but the anteroventral margin is broken and seems to have been completed on the figure from the other specimen. The other two syntypes, numbered MNHN-A13718, are two very poor moulds. Likewise, MNHN-A13720 is also a mould. Syntype MNHN-A13721 is a fairly good right valve of *Ameghinomya meridionalis* from San José, on the Valdés peninsula. The specimen is glued to a tablet and labelled on the back '*Chione meridionalis* Sow., probablement de Santa Cruz, Patagonie. MSF, 1923'. Del Río (1991: text fig. 25) figured two un-numbered specimens from the d'Orbigny Collection (and therefore syntypes) from Bajada Grande. These could not be located by us in the collections. As more than one taxon is included in the type series, and in order to avoid further nomenclatural confusions, we designate syntype MNHN-A13719 as the lectotype. Thus, the remaining specimens become paralectotypes.

***oblonga* Sowerby, 1846 [*Tellinides*?]**

Tellinella? oblonga (Sowerby, 1846) (Pl. 8, fig. 7)

v*1846 *Tellinides? oblonga* Sowerby: 250, pl. 2, fig. 12.

1887 *Tellina oblonga* Sow.; Philippi: 135, pl. 22, fig. 7.

TYPE MATERIAL. Holotype: NHM-L27961.

TYPE LOCALITY. 'Chiloé, eastern coast'. Darwin (1846) stated that his material came from Lemuy.

REMARKS. The only specimen is attached to the matrix and the hinge characters are unavailable. However, the elongate tellinid shape with an obvious left valve posterior flexure and strong comarginal ridges on the dorsal half of the anterior end suggest it may be a species of *Tellinella* Mörch, 1853 (type species, *Tellina virgata* Linnaeus, 1758). According to Sowerby (1846: 250), d'Orbigny believed this species was a *Solenella*, although he himself classed it as *Tellinides*.

***ornata* Sowerby, 1846 [*Nucula*]**

Neilo ornata (Sowerby, 1846) (Pl. 8, figs 8–9)

v*1846 *Nucula ornata* Sowerby: 251, pl. 2, fig. 19.

1899 *Neilo ornata* Sow.; Ihering: 14.

1907 *Malletia ornata* Sow.; Ihering: 228.

1998 *Neilo (Neilo) ornata* Sowerby; del Río & Camacho: 65–67, pl. 2, figs 11–14; text fig. 7.

v1999 *Neilo ornata* (Sowerby, 1846); Frassinetti & Covacevich: 16, pl. 2, figs 10–12.

TYPE MATERIAL. Lectotype (designation by del Río & Camacho 1998): NHM-L27974; paralectotype: NHM-L27975.

TYPE LOCALITY. Port Desire (Puerto Deseado, Argentina).

REMARKS. Sowerby (p. 251) noted that 'a fragment alone has been found'. However, in the collection there are two specimens: one of them is a fragment, but the other one (NHM-L27974) is the right valve figured by Sowerby (1846: pl. 2, fig. 19). This specimen is a broken right valve attached to the internal mould, and in which the anterior end is missing. It seems to have been repaired after being illustrated by Sowerby, as the crack is clearly visible, and all other features indicate it is obviously the same specimen. It remains unclear where the second fragment (NHM-L27975) comes from. The fact that Sowerby mentions 'only a fragment' may have led del Río & Camacho (1998) to believe it was the holotype, but there are in fact two syntypes. Del Río & Camacho (1998) stated that 'the holotype is a broken right valve found in the lower fossiliferous strata that crop out at Puerto Deseado (Santa Cruz Province)'. It is not clear where they drew this conclusion from, as Darwin did not mention what beds his material came from. Nevertheless, it seems likely that they are right. The fossil beds exposed near Puerto Deseado (a few kilometres inland) are probably equivalent to the late Oligocene–early Miocene Monte León Formation. In any event, there was no way of knowing or inferring from the original description that there was more than one specimen and therefore their lectotype designation by inference of holotype is valid (ICZN 1999: Art. 74.6).

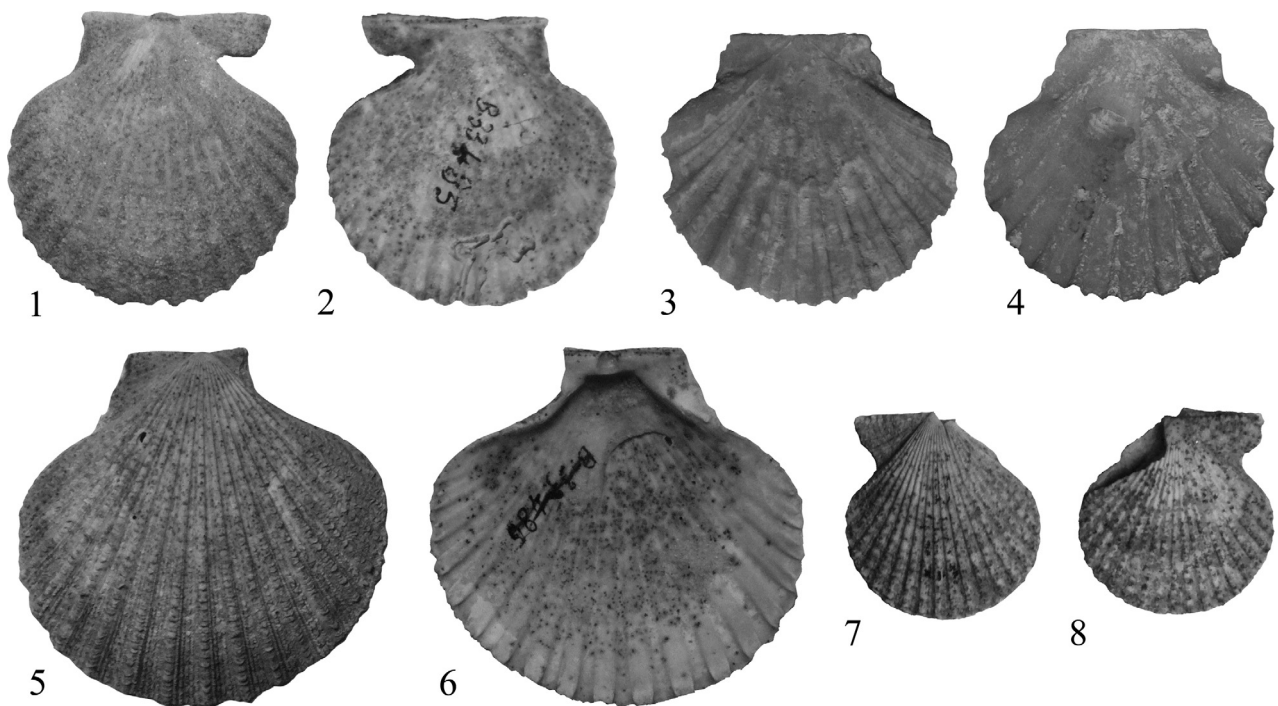


Plate 10 Figs 1–8 *Aequipecten paranensis* (d'Orbigny, 1842). 1–2, Syntype MNHN B33485 (height = 39 mm). 3–4, One of the syntypes MNHN R63973 (height = 36.3 mm). 5–6, One of the syntypes MNHN R63972 (height = 47.7 mm). 7–8, Syntype MNHN R63971 (height = 28 mm).

***paranensis* d'Orbigny, 1842 [*Pecten*]**

Aequipecten paranensis (d'Orbigny, 1842) (Pl. 10, figs 1–8)

- v*1842 *Pecten paranensis* d'Orbigny: 132–133, pl. 7, figs 5–9.
 1846 *Pecten Paranensis* D'Orbig.; Sowerby: 253, pl. 3, fig. 30.
 1907 *Myochlamys paranensis* Orb.; Ihering: 376–377.
 1939 *Myochlamys paranensis* d'Orb.; Wahnish: 151, pl. 2, figs 2a–2b.
 1967 *Chlamys paranensis* (d'Orbigny); Camacho: 66–67, pl. 9, fig. 11, pl. 10, fig. 2 (*partim*).
 1988 *Aequipecten paranensis* (d'Orbigny); del Río: pl. 4, fig. 7.
 1991 *Aequipecten paranensis paranensis* (d'Orbigny); del Río: 54–57, pl. 2, fig. 5, text-figs 17–18.
 1992 *Aequipecten paranensis paranensis* (d'Orbigny); del Río: 32–37, pl. 7, figs 1–2, text-fig. 3a, 9–10, 14, 17:1, 19:1.
 1992 *Aequipecten paranensis pennatus* n. subsp.; del Río: 37–40, pl. 6, figs 3–5; text-figs 15, 17:2, 19:2.
 1998b *Aequipecten paranensis paranensis* (d'Orbigny, 1842); del Río & Martínez Chiappara: 58, pl. 5, figs 4–5, pl. 8, fig. 13, pl. 18, fig. 7, pl. 25, fig. 8.
 1998b *Aequipecten paranensis pennatus* del Río, 1992; del Río & Martínez Chiappara: 58–59, pl. 4, figs 2–3.
 2000 '*Aequipecten*' *paranensis*; del Río: fig. 10.1.

TYPE MATERIAL. Del Río (1991: 55, text-fig. 17) illustrated two specimens housed in the Typothèque of the Laboratoire de Paléontologie under numbers MNHN-B33485 (del Río 1991: text-figs 17a and 17b, an isolated right valve) and MNHN-R63971 (del Río 1991: text-fig. 17c, a closed shell). In the figure caption she stated that the specimen

depicted in text-figs 17a and 17b is the 'holotype'. However, such an action does not fulfill the requirements for a valid lectotype designation under the terms of Article 74.5 of the ICZN, as del Río herself figured a second specimen from the d'Orbigny Collection. Additional type material of this species in the Typothèque of the Laboratoire de Paléontologie consists of MNHN-R63972 (four valves) and MNHN-R63973 (16 valves). Five other syntypes are housed in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2005/7.

TYPE LOCALITY. 'La Bajada, province d'Entre Ríos (république Argentine), a cent lieues au dessus de Buenos-Ayres' (La Bajada, province of Entre Ríos (Argentine Republic), one hundred leagues above Buenos Aires). The type locality is most probably where the modern city of Paraná is built, an area that is nowadays completely urbanised.

REMARKS. This species was amply discussed by del Río (1991, 1992) and is one of the most common taxa in the late Miocene units of northern Patagonia and Entre Ríos. This species has been widely dealt with in the literature as it is one of the most common taxa in the Puerto Madryn and Paraná Formations.

***patagonensis* d'Orbigny, 1842 [*Pecten*]**

Chesapecten patagonensis (d'Orbigny, 1842) (Pl. 9, figs 5–8)

- v*1842 *Pecten patagonensis* d'Orbigny: 131–132, pl. 7, figs 1–4.
 1852 *Pecten Patagonensis*, d'Orb.; d'Orbigny: 131.
 1907 *Myochlamys patagonensis* Orb.; Ihering: 377.
 1967 *Chlamys patagonensis* (d'Orbigny); Camacho: 67, pl. 10, figs 3–4.
 1988 *Chesapecten crassus* n.sp.; del Río, pl. 3, figs 4a–4b (*nomen nudum*).

1992 *Chesapecten crassus* n.sp.; del Río: 45–48, pl. 8, figs 1–6, text-fig. 22.

1998b *Chesapecten crassus* del Río, 1992; del Río & Martínez Chiappara: 59–60, pl. 6, figs 6–7.

TYPE MATERIAL. There are two syntypes in the Typothèque of the Laboratoire de Géologie under the Catalogue number MNHN-Gg2002/110.

TYPE LOCALITY. 'Grès verdâtre, Barranca del Sur, Río Negro' (Green sands, southern cliffs of the Río Negro).

REMARKS. The ribbing pattern of both syntypes shows that they are clearly juveniles of *Chesapecten crassus* del Río (1992: 45–48, pl. 8, figs 1–6, text-fig. 22) and thus the name that should be used for this species is d'Orbigny's.

patagonica d'Orbigny, 1842 [*Ostrea*]

Crassostrea patagonica (d'Orbigny, 1842) (Pl. 11, figs 1–2, Pl. 12, figs 1–4, Pl. 13, figs 1–3)

v*1842 *Ostrea patagonica* d'Orbigny: 133, pl. 7, figs 14–16.

1897 *Ostrea patagonica* d'Orb.; Ortmann: 356, fig. 4 (from d'Orbigny).

1901 *Ostrea patagonica* d'Orb.; Borchert: 17–19 (*partim*?).

?1939 *Ostrea patagonica*, d'Orb.; Wahnish: 150, pl. 1, figs 1a–1b.

1998b ?*Ostrea patagonica* d'Orbigny, 1842; del Río & Martínez Chiappara: 54–55, pl. 7, figs 5–6 (*partim*).

TYPE MATERIAL. Most syntypes are housed in the Typothèque of the Laboratoire de Géologie under the following numbers MNHN-Gg2002/108 (lectotype designated herein, a right valve, d'Orbigny Collection, Catalogue 3L-49); MNHN-Gg2002/109 (6 syntypes, 2 double valves and 4 left valves, d'Orbigny Collection, Catalogue 3L-50); MNHN-Gg2005/14 (4 syntypes, Bonpland Collection, Catalogue 6O-112/113); MNHN-Gg2005/8 (5 syntypes, Catalogue 7X-213/215); MNHN-Gg2005/9 (1 syntype, Catalogue 1080–7); MNHN-Gg2005/15 (syntype, the closed shell illustrated by d'Orbigny, 1842: pl. 7, fig. 15, 16); MNHN-Gg2005/10 (10 syntypes, Catalogue 3L-32). Since all have been available to d'Orbigny, they are all part of the type series. Two additional syntypes are housed in the Laboratoire de Paléontologie under number MNHN-A14086 (Catalogue Falunien B 11142).

TYPE LOCALITY. '... dans les grès quartzeux tertiaires de la Bajada, province d'Entre Ríos, république Argentine... au sud du Río Negro, en Patagonie, près de l'Ensenada de Ros... a Punta Gorda, à l'embouchure du Río Uruguay... sur la côté de Patagonie, au port Saint Julien' (... in the Tertiary quartz sands of la Bajada, province of Entre Ríos, Argentine Republic... south of the Río Negro, in Patagonia, near Ensenada Ros... at Punta Gorda, at the mouth of the Uruguay river... along the coast of Patagonia, at port San Julián). The lectotype designated herein comes from the cliffs to the south of the mouth of the Río Negro.

REMARKS. Two of the specimens in the Laboratoire de Paléontologie and two in the Laboratoire de Géologie are right valves of *Ostrea alvarezii* d'Orbigny. In order to prevent further confusion and fix the nomenclatural status of this species, the specimen illustrated in Plate 11, figs 1, 2 (i.e. MNHN-Gg2002/108) is designated lectotype herein. This right valve is preferred because the interior is available

showing the strong chomata all around the shell margin. This feature easily distinguishes it from other superficially similar oysters from the Patagonian Cenozoic. Despite the great ecomorphic variation shown by this oyster, shell features such as the deep umbonal cavity in the left valve, the shape and position of the posterior adductor muscle scar and the diffuse radial ribs on the left valve (all similar to living representatives of *Crassostrea*), allow its inclusion in *Crassostrea* Sacco, 1897 (type species *Ostrea virginica* Gmelin, 1791).

patagonica Sowerby, 1846 [*Cardita*]

Fasciculicardia patagonica (Sowerby, 1846) (Pl. 13, figs 6–7)

v*1846 *Cardita Patagonica* Sowerby: 251, pl. 2, fig. 17.

1887 *Cardita inaequalis* Philippi: 167, pl. 37, fig. 5.

v1902 *Cardita inaequalis* Philippi; Ortmann: 167, pl. 26, figs 7a–7d.

v1907 *Venericardia patagonica* Sow.; Ihering: 283–284, pl. 10, figs 67a–67b.

1907 *Venericardia inaequalis* (Phil.); Ihering: 284.

?1979 *Cardiocardita inaequalis* (Philippi, 1887); Malumián, et al.: 275, pl. 3, fig. 5.

TYPE MATERIAL. Syntype: NHM-L27955-6. The two numbers on the label suggest that at least a second syntype (but probably more) – now lost – was available to Sowerby.

TYPE LOCALITY. Santa Cruz, Argentina.

REMARKS. One of the most common carditids in the Patagonian Tertiary. The only specimen in the Sowerby Collection is a worn and broken left valve, while Sowerby's figure shows a complete valve, a further indication that other syntypes existed in the collection. Our own collections from Santa Cruz confirm that this species belongs in *Fasciculicardia* Maxwell, 1969 (type species *Venericardia subintermedia* Suter, 1917), a subgenus of *Glyptoactis* Stewart, 1930 according to Beu & Maxwell (1990: 218).

paytensis d'Orbigny, 1842 [*Pectunculus*]

Glycymeris ovata (Broderip, 1832) (Pl. 13, figs 4–5)

*1832 *Pectunculus ovatus* Broderip: 126.

v1842 *Pectunculus paytensis* d'Orbigny: 129, pl. 15, figs 11–13.

1843 *Pectunculus ovatus*; Reeve: Vol. 1 (*Pectunculus*), pl. 1, fig. 2.

1843 *Pectunculus intermedius*; Reeve, Vol. 1 (*Pectunculus*), pl. 1, fig. 1.

1896 *Pectunculus* aff. *intermedius* Brod.; Möricke: 582, pl. 12, figs 3, 4.

1922 *Glycymeris* [*sic*] *ovata*; Bosworth: pl. 25, figs 3, 4.

1960 *Glycymeris ovatus* (Broderip, 1832); Stuardo: 136, figs 1–6 (synonymy).

1961 *Glycymeris (Glycymeris) ovata* (Broderip); Olsson: 105, pl. 11, figs 6, 6a.

v1969 *Glycymeris ovata* (Broderip); Herm: 100, pl. 2, figs 3, 4.

v1984 *Glycymeris (Glycymeris) ovata* (Broderip, 1832); Frassinetti & Covacevich: 114, figs 23, 37–40.

TYPE MATERIAL. There are four syntypes in the Typothèque of the Laboratoire de Paléontologie in the MNHN in Paris, under number MNHN-A13913.



Plate 11 Figs 1–2 *Crassostrea patagonica* (d'Orbigny, 1842). Syntype MNHN-Gg2002/108 (height = 172 mm).

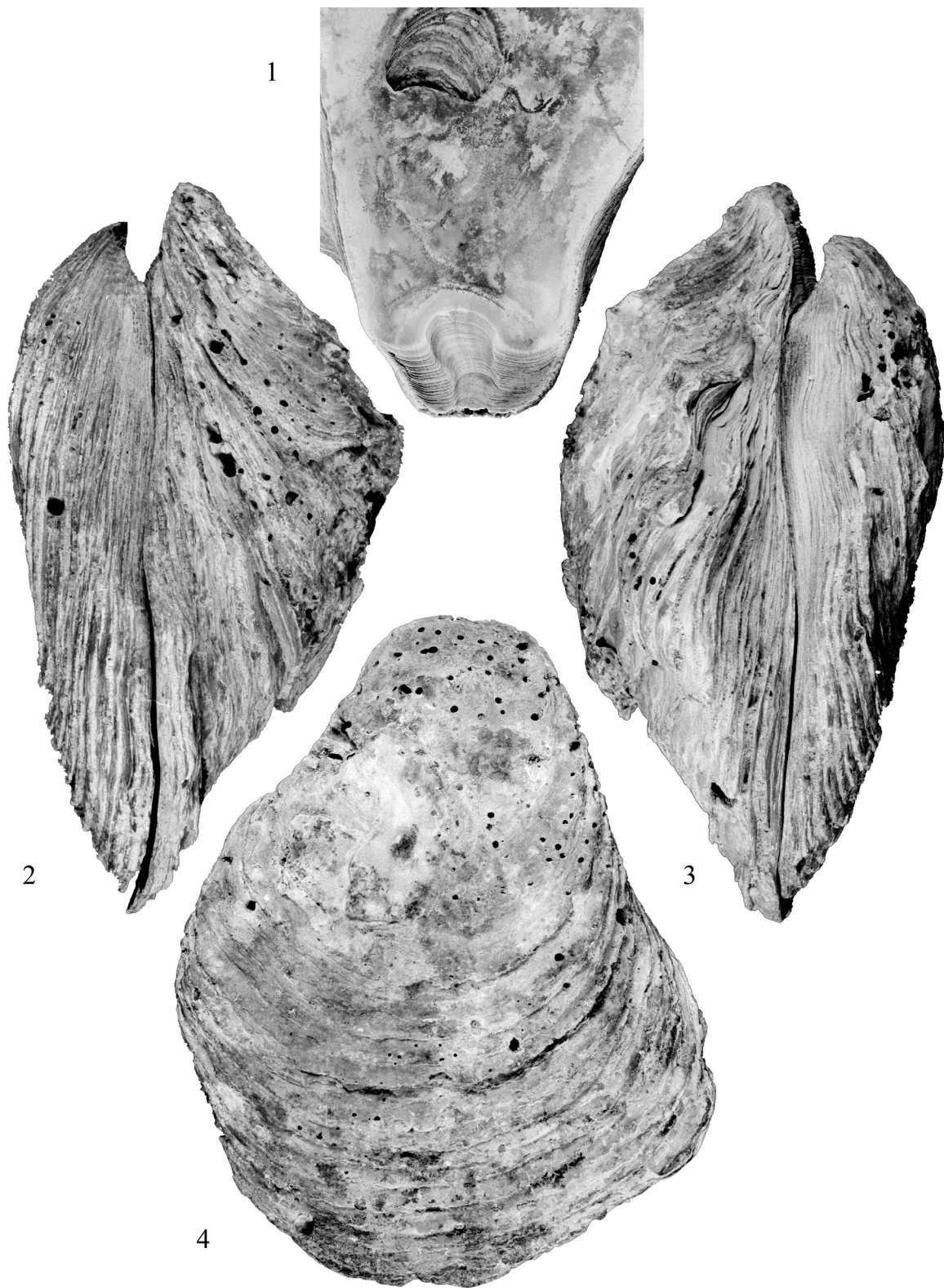


Plate 12 Figs 1–4 *Crassostrea patagonica* (d'Orbigny, 1842). 1, 4, Syntype MNHN-Gg2002/109 (1 and 2 together) (length = 76.5 mm). 2–3, Syntype MNHN-Gg2002/109–2 (height = 128 mm).

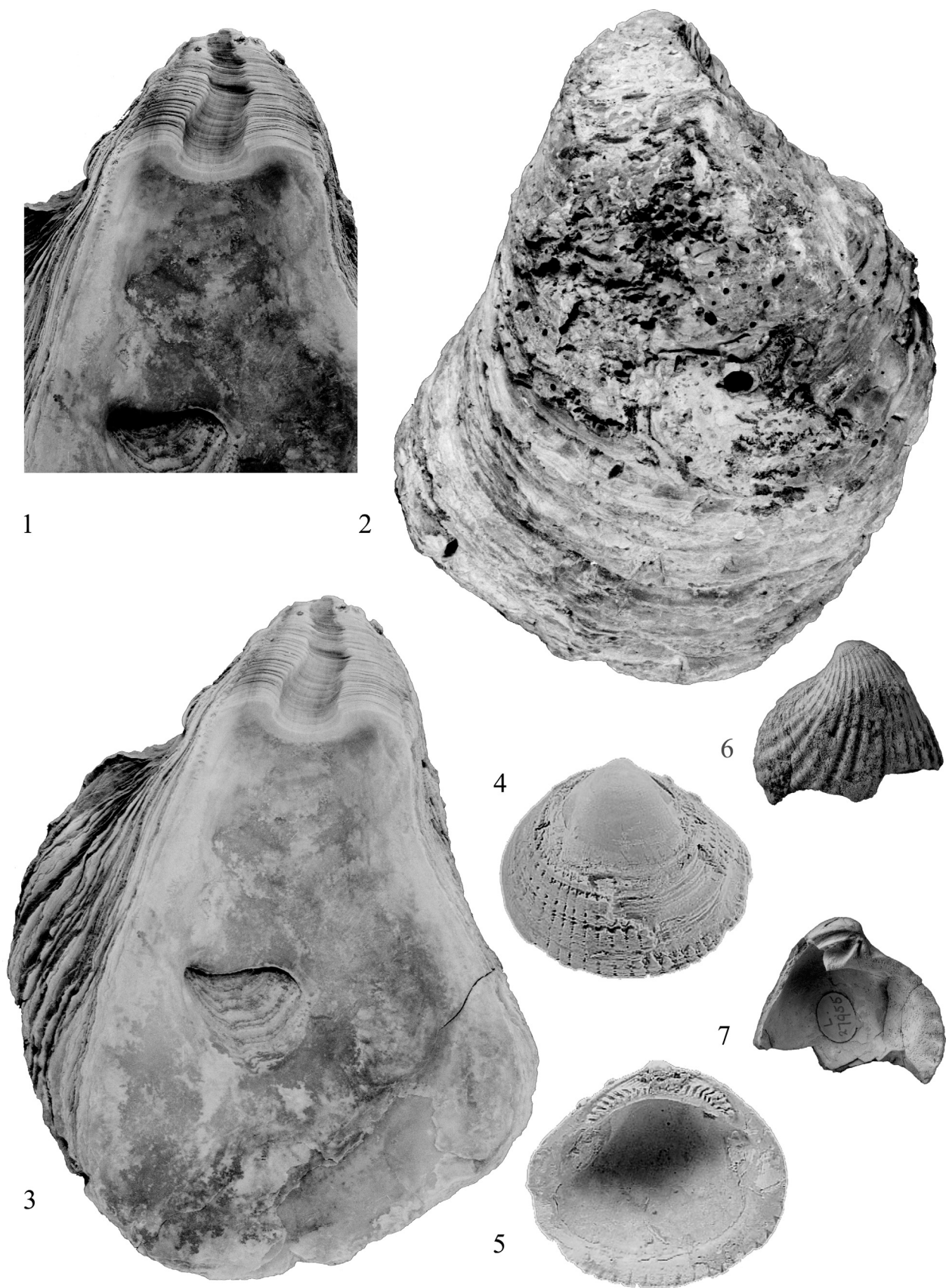


Plate 13 Figs 1–3 *Crassostrea patagonica* (d'Orbigny, 1842). Syntype MNHN-Gg2002/109-1 (height = 142 mm). Figs 4–5 *Glycymeris ovata* (Broderip, 1832). Syntype of *Pectunculus paytensis* d'Orbigny, 1842 MNHN-A13913 (height = 45 mm). Figs 6–7 *Fasciculicardia patagonica* (Sowerby, 1846). Syntype NHM-L27955-6 (height = 29.8 mm).

TYPE LOCALITY. '... empâtée avec des moules dans un terrain tertiaire à gros grains, qui couvre une partie de la côte de Payta, au nord du Pérou' (... embedded with moulds in a coarse-grained Tertiary bed that covers part of the coast of Payta, in northern Peru).

REMARKS. All four syntypes are small, badly decorticated shells in which the ligament area can be seen. The ornamentation is largely missing, but what is left suggests very weak flat radial ribs. There is no articulated pair to match d'Orbigny's plate 15, fig. 13, but it is clear that figs 11 and 12 are based on the largest two of the syntypes. The name *Pectunculus paytensis* apparently has been overlooked in all subsequent works, as it does not even appear in synonymy lists.

***petitiana* d'Orbigny, 1842 [*Venus*]**

Chionopsis petitiana (d'Orbigny, 1842) (Pl. 14, figs 1–2, 5–7)

- *1842 *Venus Petitiana* d'Orbigny: 123–124, pl. 13, figs 9–11.
- 1854 *Venus pulvinata* Hupé: 343.
- 1887 *Venus Petitiana* D'Orb.; Philippi: 121–122, pl. 15, fig. 5 (from d'Orbigny).
- 1887 *Venus crassula* Philippi: 122, pl. 15, fig. 3.
- 1887 *Venus Remondi* Philippi: 124, pl. 15, fig. 9.
- 1887 *Venus pulvinata* Hupé; Philippi: 131, pl. 16, fig. 4.
- 1887 *Venus pinguis* Philippi: 131, pl. 16, fig. 5.
- 1887 *Venus sprete* Philippi: 133, pl. 16, fig. 6.
- 1887 *Venus serva* Philippi: 133, pl. 16, fig. 1.
- 1967 *Protothaca petitiana* (D'Orb.); Herm & Paskoff: 761.
- v1969 *Chionopsis petitiana* (d'Orbigny); Herm: 121–122, pl. 10, figs 5–10.

TYPE MATERIAL. The type series seems to have included at least three specimens, two of them illustrated by d'Orbigny on plate 13, figs 9–11, and a third specimen not figured. The latter is the only specimen remaining in the d'Orbigny Collection in the Laboratoire de Paléontologie, entered in the Falunien B Catalogue under number 10891. However, we must state that the number on this specimen's label was added by someone else immediately next to the original legend '*Venus*, Coquimbo, Falunien B'. Therefore, it cannot be considered as part of the type series. A thorough search through the collections (both Paléontologie and Géologie) in the MNHN in Paris was unsuccessful in locating the illustrated type material. As remarked below, Herm (1969) identified the steinkern illustrated by d'Orbigny with the common species at Coquimbo, Tongoy and Horcón. According to Herm (1969: 122) the steinkerns are very abundant alongside other specimens in which the shell is preserved to different degrees. This allowed him to place this species in *Chionopsis* Olsson, 1932 (type species *Venus amathusia* Philippi, 1844). Although the name is commonly associated with the well preserved material from the Chilean localities, if the types (which are lost) remain the basis for this name, the situation can only lead to confusion, as there are many other venerid bivalves that are also represented by steinkerns coming from the same geological units as the original (and Herm's) material. Therefore, in order to stabilise the name, we designate as neotype of *Venus petitiana* d'Orbigny, 1842, the specimen illustrated by Herm as *Chionopsis petitiana* (Herm 1969: pl. 10, fig. 5, Bayerische Staatssammlung

für Geologie und Paläontologie BSP 1966 IV 49) coming from Quebrada Herradura, by the Pan American Highway, facies b.

TYPE LOCALITY. '... dans les grès tertiaires à gros grains de Coquimbo (Chili) et dans ceux de Payta (Pérou)' (In the coarse Tertiary sandstones of Coquimbo (Chile) and in those from Payta (Peru)). The neotype comes from Quebrada Herradura, Coquimbo. Therefore this is the type locality for *Chionopsis petitiana*.

REMARKS. The specimen originally figured by d'Orbigny (1842: pl. 13, figs 9–11) was identified by Herm (1969: 121–122, pl. 10, figs 5–10) with material collected by him in Coquimbo, Tongoy and Horcón. Designation of a neotype for this species restricts the use of the name to material that can be clearly identified with it.

***platense* d'Orbigny, 1842 [*Cardium*]**

Dinocardium platense (d'Orbigny, 1842) (Pl. 14, fig. 8)

- *1842 *Cardium platense* d'Orbigny: 120, pl. 14, figs 12–14.
- 1893 *Cardium Bravardi* Philippi: 10, pl. 1, fig. 11.
- 1901 *Cardium magnum* Born; Borchert: 34–35.
- 1994 *Dinocardium novus* n. sp.; del Río: 106–107, pl. 1, fig. 5.
- 2000 *Dinocardium novus*; del Río, fig. 11.9.

TYPE MATERIAL. A search through the collections at the MNHN in Paris was unsuccessful in locating the sole specimen that d'Orbigny illustrated. He probably had additional syntypes, but – as in the case of the illustrated one – none of them was found.

TYPE LOCALITY. '... au sein des terrains tertiaires de la Bajada, province d'Entre Ríos (Plata), sur les bords du Paraná' (... in the Tertiary beds of la Bajada, province of Entre Ríos (Plata), along the banks of the Paraná). Nowadays this is the city of Paraná, capital of the province of Entre Ríos, Argentina.

REMARKS. D'Orbigny (1842) mentioned the fact that this species is rarely found with its shell. This suggests that he had available more than one specimen. The material described more recently by del Río as *Dinocardium novus* (del Río 1994: 106–107, pl. 1, fig. 5) from Valdés Peninsula is very well preserved and generally with most of the shell. This group of bivalves is in need of revision in order to clarify its taxonomic relationships and nomenclature, but the species introduced by del Río seems to be a synonym of d'Orbigny's large species, and the features she stated as differentiating the two taxa can be attributed to size and normal intraspecific variation.

***propinquus* Hupé, 1854 [*Pecten*]**

Zygochlamys hupeanus (Philippi, 1887) (Pl. 14, fig. 4)

- v1854 *Pecten propinquus* Hupé: 291, pl. 5, fig. 2 (junior primary homonym of *Pecten propinquus* Münster, 1833).
- *1887 *Pecten Hupeanus* Philippi: 203, pl. 47, fig. 4.
- 1896 *Pecten Hupéanus* Phil.; Möricke: 578, pl. 13, figs 2–4.
- v1969 *Chlamys hupeanus* (Philippi); Herm: 104, pl. 1, figs 5–6.

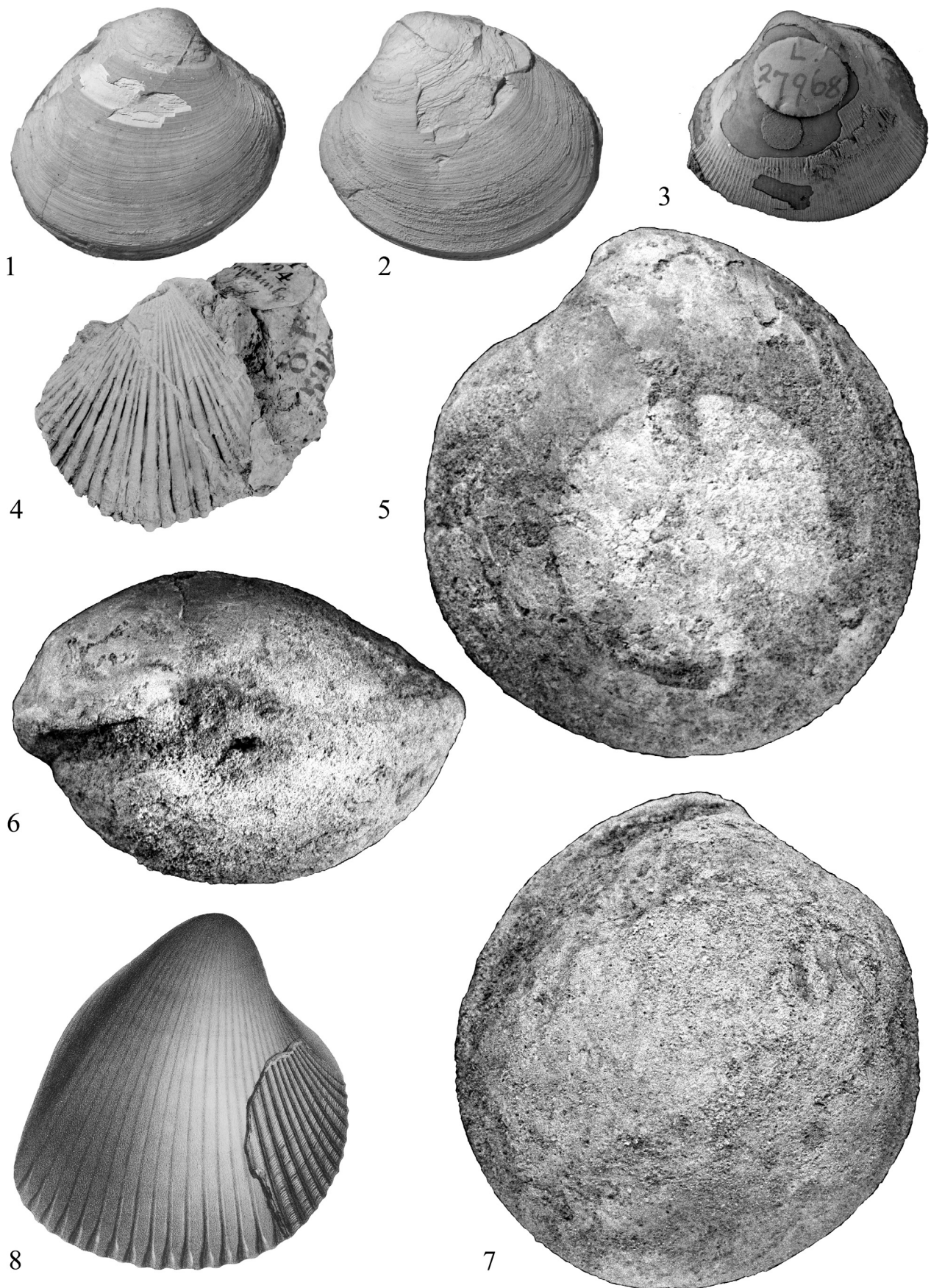


Plate 14 Figs 1–2 *Chionopsis petitiana* (d'Orbigny, 1842). Neotype BSP 1966 IV 49 (height = 45.2 mm), Herm collection, München, Germany. **Fig. 3** *Hedecardium? puelchum* (Sowerby, 1846). Syntypes NHM-L27968 (height = 38.1 mm). **Fig. 4** *Zygochlamys hupeanus* (Philippi, 1887). Syntype of *Pecten propinquus* Hupé, 1854, MNHN-Gg2002/91 (height = 44 mm). **Figs 5–7** *Chionopsis petitiana* (d'Orbigny, 1842). Syntype of *Venus pulvinata* MNHN-Gg2002/100 (height = 34.5 mm). **Fig. 8** *Dinocardium platense* (d'Orbigny, 1842), from pl. 14, figs 12–14 of d'Orbigny.

?1997 *Chlamys* cf. *hupeanus* (Philippi, 1887); Frassinetti: 62, pl. 1, fig. 11.

TYPE MATERIAL. Two syntypes in the Typothèque of the Laboratoire de Géologie under catalogue number MNHN-Gg2002/91.

TYPE LOCALITY. 'Altos de los Faluns de Coquimbo' (Top of the cliffs at Coquimbo, Chile).

REMARKS. Philippi (1887: 203) introduced *Pecten hupeanus* clearly as a replacement name for Hupé's species, as the name was preoccupied by *Pecten propinquus* Münster, 1833. He also stated (and figured in pl. 47, fig. 4) that he had one additional specimen that was left in the Museum by Gay. According to Philippi its preservation seems to have been very poor in comparison to Hupé's original figured material, but Philippi was correct in identifying both species. Möricke (1895: 578, pl. 13, figs 2–4) described and figured material he also correctly placed under *Pecten hupeanus* Philippi. Herm (1969: 103), who never saw Hupé's type material, included *Pecten propinquus* (apparently only Hupé's types) as a synonym of *Pecten vidali* Philippi, 1887. However, he also described *Pecten hupeanus* from Caldera and Coquimbo, stating that the holotype of *Pecten hupeanus* Philippi was in the 'Museo Nacional de Historia Natural' in Santiago, Chile. However, the specimen there is the one mentioned by Philippi and labelled *Pecten propinquus* and left behind by Gay. As *Pecten hupeanus* is clearly a replacement name for *Pecten propinquus* Hupé, the type material is the type material available to Hupé, and not Philippi's additional specimens (ICZN 1999: Art. 72.7). In any event, Herm (1969: 106) compared *Pecten vidali* and *Pecten hupeanus* as closely related species, only separable by means of slight differences in the ornamentation. The shell outline and geminate ribs indicate this species belongs in *Zygochlamys* Ihering, 1907.

***puelchum* Sowerby, 1846 [*Cardium*]**

Hedecardium? *puelchum* (Sowerby, 1846) (Pl. 14, fig. 3)

v*1846 *Cardium Puelchum* Sowerby: 607, pl. 2, fig. 15.

1902 *Cardium puelchum* Sowerby; Ortmann: 133, pl. 27, fig. 7.

v1999 *Trachycardium puelchum* (Sowerby, 1846); Frassinetti & Covacevich: 28, pl. 5, figs 9–10.

TYPE MATERIAL. Two syntypes: NHM-L27968 and NHM-L27969 (Santa Cruz).

TYPE LOCALITY. Santa Cruz, Argentina.

REMARKS. Sowerby's figure is probably a composite of the two syntypes, showing the size and shape of the smaller and reasonably complete articulated internal mould NHM-L27968, and the faint sculptural remnant of the other, larger and incomplete mould of one valve MBNH-L27969, which is about one and a half times the size of the smaller specimen. Rib pattern suggests that this species fits better in *Hedecardium* Marwick, 1944 (type species *Cardium waitakienensis* Suter, 1907), than in *Trachycardium* Mörch, 1853b (type species *Cardium isocardia* Linnaeus, 1758), where it was placed by Frassinetti & Covacevich (1999).

***pulvinata* Hupé, 1854 [*Venus*]**

Chionopsis petitiana (d'Orbigny, 1842) (Pl. 14, figs 5–7)

v1854 *Venus pulvinata* Hupé: 343.

1887 *Venus pulvinata* Hupé; Philippi: 125, pl. 16, fig. 4.

TYPE MATERIAL. There are three syntypes in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/100.

TYPE LOCALITY. 'Coquimbo'. Coquimbo, Chile.

REMARKS. Philippi (1887: 125) stated that he had specimens collected by himself at Coquimbo and that appeared to belong in Hupé's species. He did not, however, illustrate or describe them. Herm (1969: 121; see entry under *petitiana* d'Orbigny, 1842 [*Venus*] herein) correctly synonymised this species with *Chionopsis petitiana* (d'Orbigny, 1842).

***radula* Hupé, 1854 [*Amphidesma*]**

Amphidesma radula Hupé, 1854 (Pl. 15, figs 1–3)

v*1854 *Amphidesma radula* Hupé: 361, pl. 6, fig. 2.

1887 *Semele radula* (*Amphidesma*) Hupé; Philippi: 150, pl. 28, fig. 7 (from Hupé).

TYPE MATERIAL. Three syntypes were found in the Collection of the Laboratoire de Géologie, at the MNHN in Paris. These are housed there in the Typothèque under number MNHN-Gg2002/98.

TYPE LOCALITY. 'Cerca de Coquimbo' (Near Coquimbo, Chile).

REMARKS. All three syntypes are unidentifiable internal moulds. One of the specimens seems to be the one figured by d'Orbigny (1842: pl. 6, fig. 2), but does not show the crack that the figured specimen has. The only trace of a crack on it is near the umbones. This species remains a *nomen dubium*.

***rostrata* Hupé, 1854 [*Ostrea*]**

Crassostrea transitoria (Hupé, 1854)

v1854 *Ostrea rostrata* Hupé: 283.

v1969 *Ostrea* (*Ostrea*) *longiuscula* Hupé; Herm: 112–113, pl. 7, figs 2–4.

TYPE MATERIAL. Two syntypes under MNHN-Gg2002/90 (d'Orbigny Collection, Catalogue 8P, 593).

TYPE LOCALITY. 'Terrenos terciarios de Coquimbo' (Tertiary of Coquimbo).

REMARKS. Both syntypes are obviously conspecific with *Ostrea transitoria* and *Ostrea maxima*. Herm (1969) believed this species was conspecific with *Ostrea longiuscula* Hupé, 1854 (p. 283), a species from Quaternary and Recent deposits and probably a synonym of *Ostrea chilensis* (Philippi in Küster, 1844). However, when a large enough series is available it becomes clear that the types (apparently not examined by Herm) are only variations of *Ostrea transitoria* (i.e. smaller specimens of *Ostrea maxima*). See entries under *maxima* Hupé, 1854 [*Ostrea*] and *transitoria* Hupé, 1854 [*Ostrea*] herein.

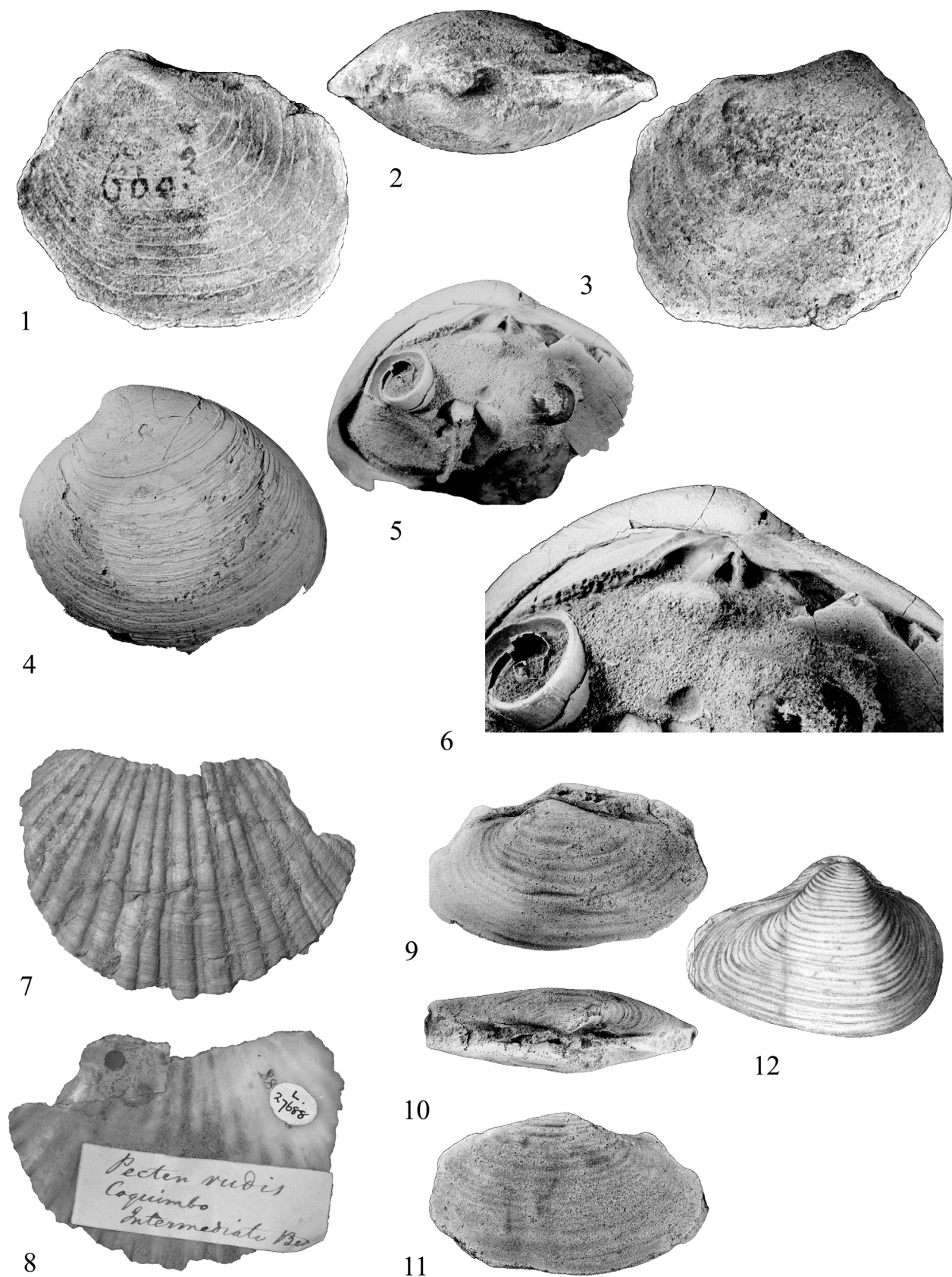


Plate 15 Figs 1–3 *Amphidesma radula* Hupé, 1854. Syntype MNHN-Gg2002/98 (height = 30 mm). Figs 4–6 *Retrotapes rouaultii* (Hupé, 1854). Holotype MNHN-Gg2002/53 (height = 48.8 mm). Figs 7–8 *Argopecten purpuratus* (Lamarck, 1819). Holotype of *Pecten rudis* Sowerby, 1846 NHM-L27688 (width = 60 mm). Figs 9–11 *Mya? simplex* (Hupé, 1854). Syntype MNHN-Gg2002/64 (height = 29 mm). Fig. 12 '*Mya*' *rugata* (Sowerby, 1846), from pl. 2, fig. 8 of Sowerby.

rouaultii* Hupé, 1854 [Venus]Retrotapes rouaultii* (Hupé, 1854) (Pl. 15, figs 4–6)v*1854 *Venus Rouaultii* Hupé: 339–340.

TYPE MATERIAL. The holotype is housed in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/53.

TYPE LOCALITY. ‘Chiloé’ (Chiloé Island, Chile). Catalogue 8P states ‘entre San Carlos et Cucao’ (between San Carlos and Cucao, Chiloé).

REMARKS. The holotype is clearly a species of *Retrotapes* del Río, 1997. Shell outline resembles closely *Retrotapes ninfasiensis* (del Río, 1997), only that the shells are conspicuously more inflated and the nymphae seem to be much stronger. Unfortunately, the shell interior is not available in the holotype and we have no comparable material from Chiloé available for further examination.

rudis* Sowerby, 1846 [Pecten]Argopecten purpuratus* (Lamarck, 1819) (Pl. 15, figs 7–8)*1819 *Pecten purpuratus* Lamarck: 166.v1846 *Pecten rudis* Sowerby: 254, pl. 3, fig. 32.1887 *Pecten rudis* Sow.; Philippi: 204, pl. 47, fig. 3.v1969 *Chlamys* (*Aequipecten*) *purpurata* (Lamarck); Herm: 107–109, pl. 4, figs 1–5.1969 *Argopecten purpuratus* (Lamarck, 1819); Waller: 48, pl. 7–10.

TYPE MATERIAL. Holotype of *Pecten rudis*: NHM-L27688 (Coquimbo).

TYPE LOCALITY. ‘Coquimbo, Chile’. The original label by Darwin reads ‘intermediate bed’.

REMARKS. This species is based on a small fragment – the holotype of *Pecten rudis* – of a disc of a poorly preserved coarsely costate pectinid. The figure (Sowerby, 1846: pl. 3, fig. 32) seems to be a reconstruction of this. According to Philippi (1887: 204), this species is similar to *Argopecten purpuratus* from the Quaternary beds of Coquimbo. This was later confirmed by Herm (1969: 107–109, pl. 4, figs 1–5), who synonymised it with the Quaternary species. Herm included this taxon in *Chlamys* (*Aequipecten*), but we here follow Waller (1969) and place it within *Argopecten* Monterosato, 1889 (type species *Pecten solidulus* Reeve, 1853).

rugata* Sowerby, 1846 [Mactra?]‘Mya’ rugata* (Sowerby, 1846) (Pl. 15, fig. 12)*1846 *Mactra ? rugata* Sowerby: 249, pl. 2, fig. 8.1887 *Mactra? rugata* Sow.; Philippi: 143, pl. 32, fig. 6.v1907 *Panopaea nucleus* Ih.; Ihering: 326–327, pl. 12, figs 85a–85b (*non* Ihering, 1899, p. 23, pl. 1, fig. 7).? 1995 *Panopea ibari* Philippi; Chiesa, *et al.*: 46, pl. 4, figs 4a–4b.? 1995 *Mya* (*Arenomya*) *nucleoides* (Wilckens); Chiesa *et al.*: 48, pl. 4, figs 5a–5b.v1999 *Panopea nucleus* (Ihering, 1899); Frassinetti & Covacevich: 41, pl. 8, figs 2–4.

TYPE MATERIAL. The only original specimen, the holotype, was not located in the Darwin Collection at the NHM and is, presumably, lost (see below).

TYPE LOCALITY. Santa Cruz, Argentina.

REMARKS. The identity of this species has been in doubt over the years, as the holotype seems to have been lost early in the history of the Darwin Collection. However, it can be clearly identified with the specimen that Ihering (1907: 326–327, pl. 12, figs 85a–85b) illustrated as *Panopea nucleus* (*non* *Panopea nucleus* Ihering, 1899: 23, pl. 1, fig. 7). This specimen shows a very thin shell with a delicate ornamentation of radial rows of minute pustules. The exact nature of the shell in the very few specimens in which it is preserved is not known, but the possibility of this species being an anomalodesmatan cannot be ruled out. It certainly does not belong in *Panopea nucleus*, a species that presumably had a typical thick *Panopea*-like shell with a smooth interior (as this is all that can be seen in the holotype). The name *Panopea nucleus* has been used over the years for specimens from various localities and ages from southern South America, but many of these, as is the case of the specimen in the Ihering Collection assigned to *Panopea nucleus*, fit better in Sowerby’s species. The generic position must remain uncertain and, while certainly not belonging in *Panopea*, further study of good interiors is needed to confirm an anomalodesmatan relationship. In the meantime, we provisionally place them in *Mya*, because of their overall similarity with species such as *Mya nucleoides* (Wilckens, 1911) from the Antarctic Eocene (Stillwell & Zinsmeister 1992). A neotype for ‘*Mya*’ *rugata* is needed in order to stabilise the name and avoid continued confusion with other taxonomic units in the future. However, we prefer to wait until better material is collected and the generic position is clarified before such an action is taken.

Philippi (1887: 143, pl. 32, fig. 6) described a specimen from Levu (i.e. Lebu, Chile) that he identified with Sowerby’s material. He mentioned the presence on the outer shell surface of small microscopic pustules on the median area of the shell, a feature also observable on Ihering’s illustrated specimen (Ihering 1907: pl. 12, figs 85a–b).

simplex* Hupé, 1854 [Panopea]Mya? simplex* (Hupé, 1854) (Pl. 15, figs 9–11)v*1854 *Panopaea simplex* Hupé: 374, pl. 6, fig. 7.1887 *Panopea simplex* Hupé; Philippi: 160, pl. 34, fig. 4.

TYPE MATERIAL. Three syntypes were located in the Collection of the Laboratoire de Géologie, MNHN in Paris. They are now housed in the Typothèque of the Laboratoire under number MNHN-Gg2002/64.

TYPE LOCALITY. ‘Quiriquina’ (Quiriquina Island, Chile).

REMARKS. This specific name has been used for material from Quiriquina as well as for other material coming from further south in Patagonia (Wilckens 1905; Wetzel 1960; Stinnesbeck 1986). In all cases the material comes from sediments that are either late Cretaceous or Palaeocene in age. The thin shell and the narrow slit-like posterior gape seem to relate this species better to *Mya* than to *Panopea*, but a definite generic position can only be achieved with careful study of shell interiors.

subalbicans* Hupé, 1854 [Venus]Retrotapes exalbidus* (Dillwyn, 1817) (Pl. 16, figs 1–3)v1854 *Venus aerea* Hupé: 338–339.

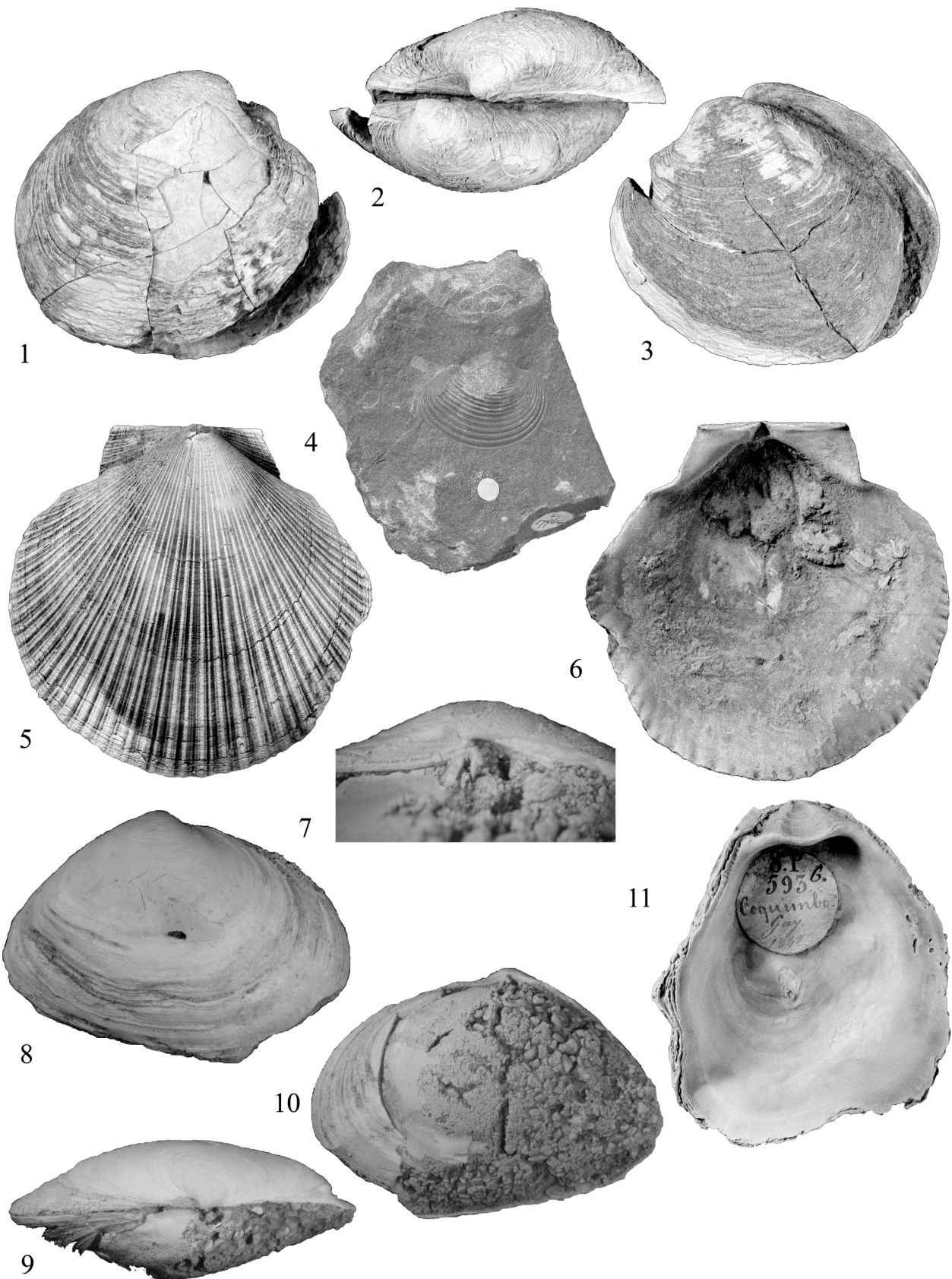


Plate 16 Figs 1–3 *Retrotapes exalbidus* (Dillwyn, 1817). Syntype of *Venus subalbicans* Hupé, 1854 MNHN-Gg2002/58 (height = 56.5 mm). **Fig. 4** *Tawera? sulculosa* (Sowerby, 1846). Holotype NHM-L27964 (height = 18 mm). **Figs 5–6** *Zygochlamys tenuicostatus* (Hupé, 1854). Holotype MNHN-Gg2002/55 (height = 65 mm). **Figs 7–10** *Cumingia variabilis* (Hupé, 1854). Syntype MNHN-Gg2002/123–1 (height = 15 mm). **7**, Hinge, detail of Fig. 10. **Fig. 11** *Crassostrea transitoria* (Hupé, 1854). Syntype MNHN-Gg2002/90–3 (height = 62 mm).

- v1854 *Venus subalbicans* Hupé: 339.
 1887 *Venus aerea* Hupé; Philippi: 111–112.
 1887 *Venus subalbicans* Hupé; Philippi: 122.

TYPE MATERIAL. There are two syntypes in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/58, plus a few unidentifiable fragments.

TYPE LOCALITY. ‘Provincia de Concepción’ (Province of Concepción, Chile). Catalogue 8P states Arauco and this species definitely comes from the Tubul Formation (Pliocene), Península Arauco, where it is very common.

REMARKS. Philippi (1887: 122) had doubts whether this species came from Cretaceous or from Tertiary rocks, but it definitely comes from the Pliocene Tubul Formation in Península Arauco, where it is a very common species (our unpublished data). The shell interior of the syntypes is not available, and they are not very well preserved. However, there can be no doubt that this species is a synonym of *Venus aerea* Hupé (1854: 338–339), which is cited as coming from Quiriquina and Concepción but listed in Catalogue 8P as coming from the same locality (‘76 – Arauco’) as *Venus subalbicans*. Both species were synonymised by S.W. Nielsen & C. Valdovinos (unpublished results) with *Retrotapes exalbidus* (Dillwyn, 1817). See also the comments under *aerea* Hupé, 1854 [*Venus*] herein.

***sulculosa* Sowerby, 1846 [*Cytherea*]**

Tawera? sulculosa (Sowerby, 1846) (Pl. 16, fig. 4)

- v*1846 *Cytherea sulculosa* Sowerby: 250, pl. 2, fig. 14.
 1852 *Venus sulculosa* d’Orb.; d’Orbigny: 109.
 ? 1854 *Venus gayi* Hupé: 337, pl. 6, fig. 5.
 1887 *Venus* (*Cytherea?*) *sulculosa* Sow.; Philippi: 122, pl. 14, fig. 3 (from Sowerby).
 ? 1969 *Clausinella gayi* (Hupé); Herm: 126, pl. 12, figs 7–8.

TYPE MATERIAL. Holotype: NHM-L27964 (Chiloé).

TYPE LOCALITY. Chiloé, eastern coast; islands of Guafo and Ipún?

REMARKS. Sowerby noted also ‘islands of Huafo and Ypun?’ (note that the names Huafo and Ypun are spelled Guafo and Ipún now). Most sediments of Chiloé and Ipún are of Miocene to early Pliocene age (Frassinetti 2004; Finger *et al.* 2007) while on Guafo only Pliocene deposits are known (Frassinetti 1997, 2000).

This is a coarsely costate venerid, but the hinge and part of the margin are embedded in hard matrix. It possibly belongs in *Tawera* Marwick, 1927 (type species *Venus spissa* Deshayes, 1835) and probably is a senior synonym of *Venus gayi* Hupé. However, the correct generic placement remains uncertain and needs confirmation.

***tenuicostatus* Hupé, 1854 [*Pecten*]**

Zygochlamys patagonica (King & Broderip, 1832)
 (Pl. 16, figs 5–6)

- *1832 *Pecten patagonicus* King & Broderip: 337.
 v1854 *Pecten tenuicostatus* Hupé: 291, pl. 5, fig. 4.
 1887 *Pecten tenuicostatus* Hupé; Philippi: 203, pl. 47, fig. 1.
 1896 *Pecten tenuicostatus* Hupé; Möricke: 580.

- v1995 *Chlamys tenuicostatus* (Hupé, 1854); Frassinetti & Covacevich: 52–53, pl. 1, figs 6–9, text fig. 3b.

TYPE MATERIAL. Holotype housed in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/55 (a well preserved right valve).

TYPE LOCALITY. ‘Faluns de Chiloé’ (Cliffs of Chiloé Island, Chile). The term ‘cliffs’ recalls the locality of Cucao, which, however, is older (Miocene) than either Tubul or Isla Guambín (Pliocene) where this species was recorded (see below).

REMARKS. This species is quite common in Tubul, but not so in Chiloé. Philippi (1887) had doubts about Hupé’s (1854) reference to Chiloé as the locality and believed it did not occur further south of Tubul. However, such a southward range was confirmed by Frassinetti & Covacevich (1995: 53) who recorded it from Guambín Island. All shell features of this species indicate it belongs in *Zygochlamys* and it was synonymised with the extant *Z. patagonica* (King & Broderip, 1832) by S.N. Nielsen & C. Valdovinos (unpublished results). *Zygochlamys patagonica* is the type species of *Psychrochlamys* Jonkers, 2003, which we consider a synonym of *Zygochlamys* Ihering, 1907 (type species *Pecten geminatus* Sowerby, 1846, see above).

***transitoria* Hupé, 1854 [*Ostrea*]**

Crassostrea transitoria (Hupé, 1854) (Pl. 16, fig. 11)

- v*1854 *Ostrea transitoria* Hupé: 283, pl. 4, fig. 3.
 v1854 *Ostrea rostrata* Hupé: 283.
 1896 *Ostrea transitoria* Hupé; Möricke: 576.
 1896 *Ostrea Benecki* nov. sp.; Möricke: 574, pl. 13, fig. 1.
 v1869 *Ostrea* (*Crassostrea*) *maxima* Hupé; Herm 113–114, pl. 6, figs 1–2.
 v1969 *Ostrea* (*Ostrea*) *transitoria* Hupé; Herm: 113, pl. 7, figs 5–6.
 v1969 *Ostrea* (*Ostrea*) *longiuscula* Hupé; Herm: 112–113, pl. 7, figs 2–4.

TYPE MATERIAL. There are 21 syntypes of this nominal species in the Collection of the Laboratoire de Géologie in the MNHN in Paris, under numbers MNHN-Gg2002/90. As discussed under *Ostrea rostrata*, syntypes of this latter species might be included in these 21 syntypes.

TYPE LOCALITY. ‘Formaciones Terciarias de Coquimbo’ (Tertiary formations of Coquimbo, Chile).

REMARKS. This species is based on juveniles of *Ostrea maxima* but *O. maxima* is a junior primary homonym of *O. maxima* Linnaeus, 1758 so *O. transitoria* must be used for this species. See entries under *maxima* Hupé, 1854 [*Ostrea*] and *rostrata* Hupé, 1854 [*Ostrea*] herein.

***variabilis* Hupé, 1854 [*Amphidesma*]**

Cumingia variabilis (Hupé, 1854) (Pl. 16, figs 7–10,
 Pl. 17, figs 1–3)

- v*1854 *Amphidesma variabilis* Hupé: 360, pl. 6, fig. 12.
 1887 *Semele variabilis* (*Amphidesma*) Hupé; Philippi: 151, pl. 32, fig. 13 (from Hupé).

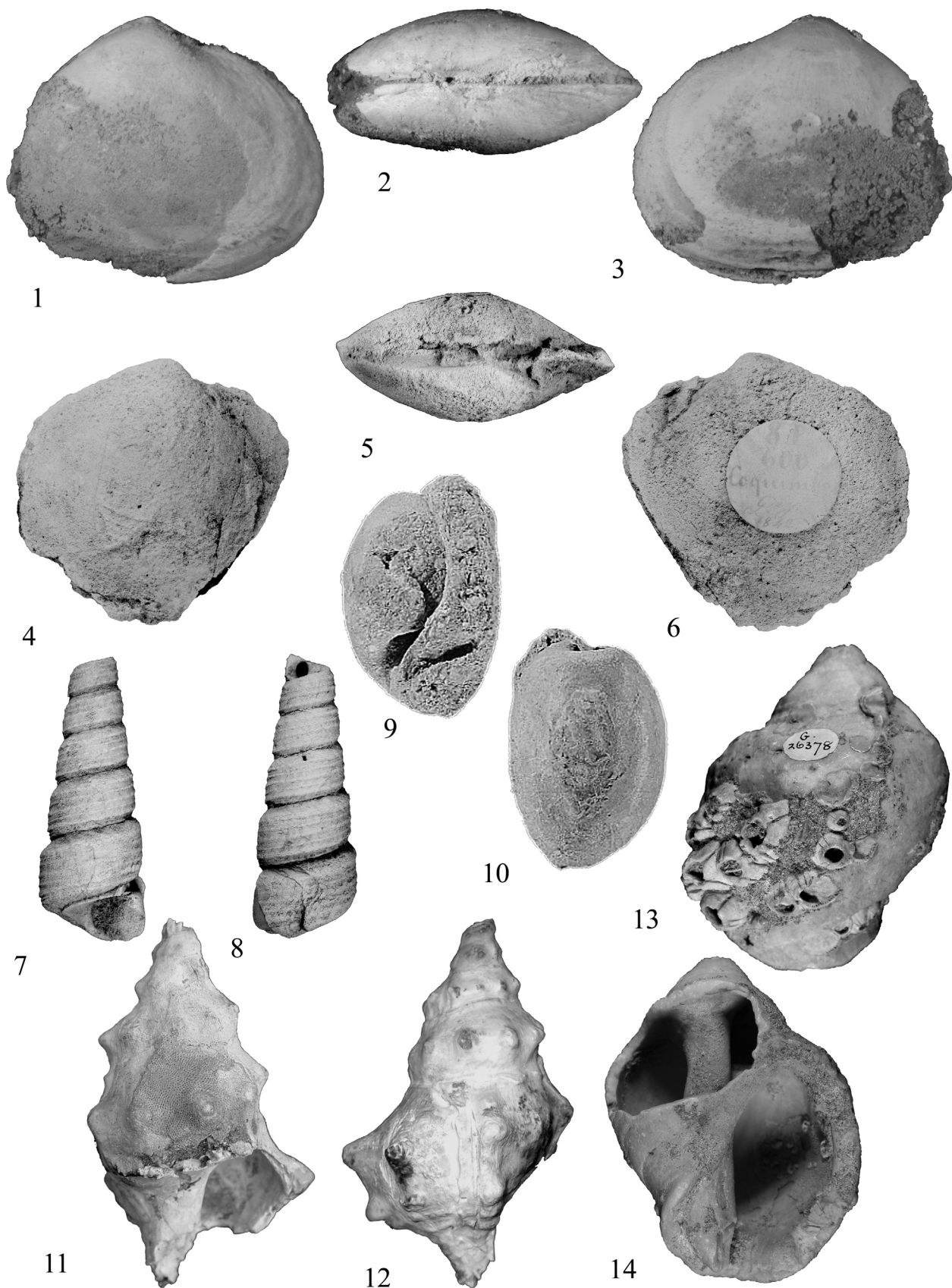


Plate 17 **Figs 1–3** *Cumingia variabilis* (Hupé, 1854). Syntype MNHN-Gg2002/123-2 (height = 11.9 mm). **Figs 4–6** *Venus villanovae* Hupé, 1854. Holotype MNHN-Gg2002/97 (height = 42.5 mm). **Figs 7–8** *Incatella hupei* Nielsen in DeVries, 2007. Syntype of *Turritella affinis* Hupé, 1854, MNHN-Gg2002/49 (height = 29 mm). **Figs 9–10** *Bulla subambigua* d'Orbigny, 1852. Holotype MNHN-R63174 (height = 41.6 mm). **Figs 11–12** *Sassia armata* (Hupé, 1854). Holotype MNHN-Gg2001/21 (height = 65.1 mm). **Figs 13–14** *Acanthina unicornis* (Bruguière, 1789). Holotype of *Monoceros ambiguus* Sowerby, 1846 NHM-G26378 (height = 57.5 mm).

TYPE MATERIAL. There are three syntypes housed in the Laboratoire de Géologie at the MNHN under number MNHN-Gg2002/123.

TYPE LOCALITY. 'Cerca de Cahuil, provincia de Colchagua' (Near Cahuil, province of Colchagua, Chile (i.e. Navidad)).

REMARKS. Although placing it in *Semele* Schumacher, 1817 (type species *Tellina proficua* Pulteney, 1799), Philippi (1887: 151) stated that he felt inclined to place this species in *Cumingia* Sowerby, 1833 (type species *Cumingia lamellosa* Sowerby, 1833), noting that it was possibly identical with his *Cumingia antiqua* Philippi (1887: 151, pl. 23, fig. 10).

villanovae Hupé, 1854 [Venus]

'Venus' villanovae Hupé, 1854 (Pl. 17, figs 4–6)

v*1854 *Venus Villanovae* Hupé: 343.

1887 *Venus Villanovae* Hupé; Philippi: 125–126, pl. 18, fig. 7.

TYPE MATERIAL. The only specimen located in the collections in Paris is MNHN-Gg2002/97, which is considered to be the holotype as there is no indication that there was additional material available.

TYPE LOCALITY. 'Terrenos Terciarios de Coquimbo' (Tertiary beds of Coquimbo, Chile).

REMARKS. The holotype was not illustrated by Hupé and is a very poorly preserved internal mould in which no internal characters are visible and even the margins are broken off. Philippi's identification of his material (Philippi 1887: 125–126, pl. 18, fig. 7) with this species rests on insufficient evidence. Many venerid-like bivalve steinkerns from the Chilean Tertiary around Coquimbo could be identified with it, so the name must remain a *nomen dubium*.

Gastropoda

affinis Hupé, 1854 [Turritella]

Incatella hupei Nielsen in DeVries, 2007 (Pl. 17, figs 7–8)

v*1854 *Turritella affinis* Hupé: 155–156, pl. 2, fig. 7 (junior primary homonym of *T. affinis* Müller, 1851, p. 31, pl. 3, fig. 11).

v1887 *Turritella affinis* Hupé; Philippi: 72, pl. 9, fig. 31.

1896 *Turritella affinis* Hupé; Möricke: 555, pl. 11, fig. 3.

1897 *Turritella affinis* Hupé; Philippi, pl. 10, fig. 2.

v2007 *Incatella hupei* Nielsen, new name; DeVries: 117, figs 3.12–3.17.

TYPE MATERIAL. There are 10 syntypes present in the d'Orbigny Collection at the Laboratoire de Géologie under number MNHN-Gg2002/49.

TYPE LOCALITY. '... capas del tuff calcario de Chiloé y de Cahuil, en la provincia de Colchagua' (... calcareous tuff of Chiloé and from Cahuil, in the province of Colchagua, i.e. Chiloé and Navidad).

REMARKS. Hupé (1854), Philippi (1887) and Möricke (1896) noted the close relation to the Recent *Turritella cingulata* Sowerby, 1825 (type species of *Incatella* DeVries, 2007) living along the Chilean coast. Möricke (1896) described *Turritella cingulatiformis* as a Pliocene intermediate form between those two species (see Herm 1969). *Incatella hupei* is common in the Miocene sediments of Navidad, Arauco

and Chiloé. DeVries (2007) erected the genus name *Incatella* for the species group leading to the Recent type species *Turritella cingulata*. *Turritella affinis* Hupé, 1854 is a junior primary homonym of *Turritella affinis* Müller, 1851.

alta Sowerby, 1846 [Voluta]

Adelomelon alta (Sowerby, 1846) (Pl. 18, figs 1–2)

*1846 *Voluta alta* Sowerby: 262, pl. 4, fig. 75.

1887 *Voluta alta* Sow.; Philippi: 65, pl. 7, fig. 6 (from Sowerby).

v2007 *Adelomelon alta* (Sowerby, 1846); Nielsen & Frassinetti: 93, figs 9.1, 9.2.

TYPE MATERIAL. Sowerby (1846: 262) stated that he had a single specimen from Navidad, which would be the holotype, and 'two casts apparently belonging to this species, but considered by M. d'Orbigny as different' from Santa Cruz, which would not have type status. In the NHM only one specimen remains (NHM-G25287) labelled as Santa Cruz, agreeing only very vaguely with the figure. A neotype (SGO.PI.6274) was designated by Nielsen & Frassinetti (2007) within a review of the Chilean Neogene volutes.

TYPE LOCALITY. Navidad, Navidad Formation, Miocene, Central Chile.

REMARKS. Sowerby (1846: 262) stated that 'there is only one specimen of this remarkable shell, of which the anterior part is so imperfect, that no part of the inner lip or of the canal is to be seen'. From this statement it can be concluded that this specimen would be the holotype from Navidad. It is evident that Sowerby had doubts about the 'two casts apparently belonging to this species, but considered by M. d'Orbigny as different' from Santa Cruz. Following ICZN Article 72.4.1 the latter specimens are therefore not part of the type series. The remaining specimen from Santa Cruz (see del Río & Martínez, 2006: figs 14.5 and 14.6) has been used for the aperture in the composite figure given by Sowerby (1846: pl. 4, fig. 75) but the figured spire is that of the lost holotype.

ambigua d'Orbigny, 1842 [Bulla]

Bulla subambigua d'Orbigny, 1852 (Pl. 17, figs 9–10)

v*1842 *Bulla ambigua* d'Orbigny: 113, pl. 12, figs 1–3 (junior primary homonym of *B. ambigua* Gmelin, 1791).

1852 *Bulla subambigua* d'Orb., 1847; d'Orbigny: 96 (*nomen novum*).

1887 *Bulla ambigua* D'Orb.; Philippi: 103, pl. 13, figs 1a–1b.

TYPE MATERIAL. The holotype is housed in the Typothèque of the Laboratoire de Paléontologie under catalogue number MNHN-R63174.

TYPE LOCALITY. '...aux environs de Coquimbo (Chili), dans un grès compacte gris, à gros grains' (... around Coquimbo (Chile), within a compact, gray and coarse-grained sand).

REMARKS. The holotype is a very poor internal mould. Without further material with shell preserved, generic assignment can only be tentative. Due to general shell shape and a thickened columellar base this species is still regarded as belonging to *Bulla* Linnaeus, 1758 (type species *Bulla ampulla* Linnaeus, 1758). The sediment is very atypical for the

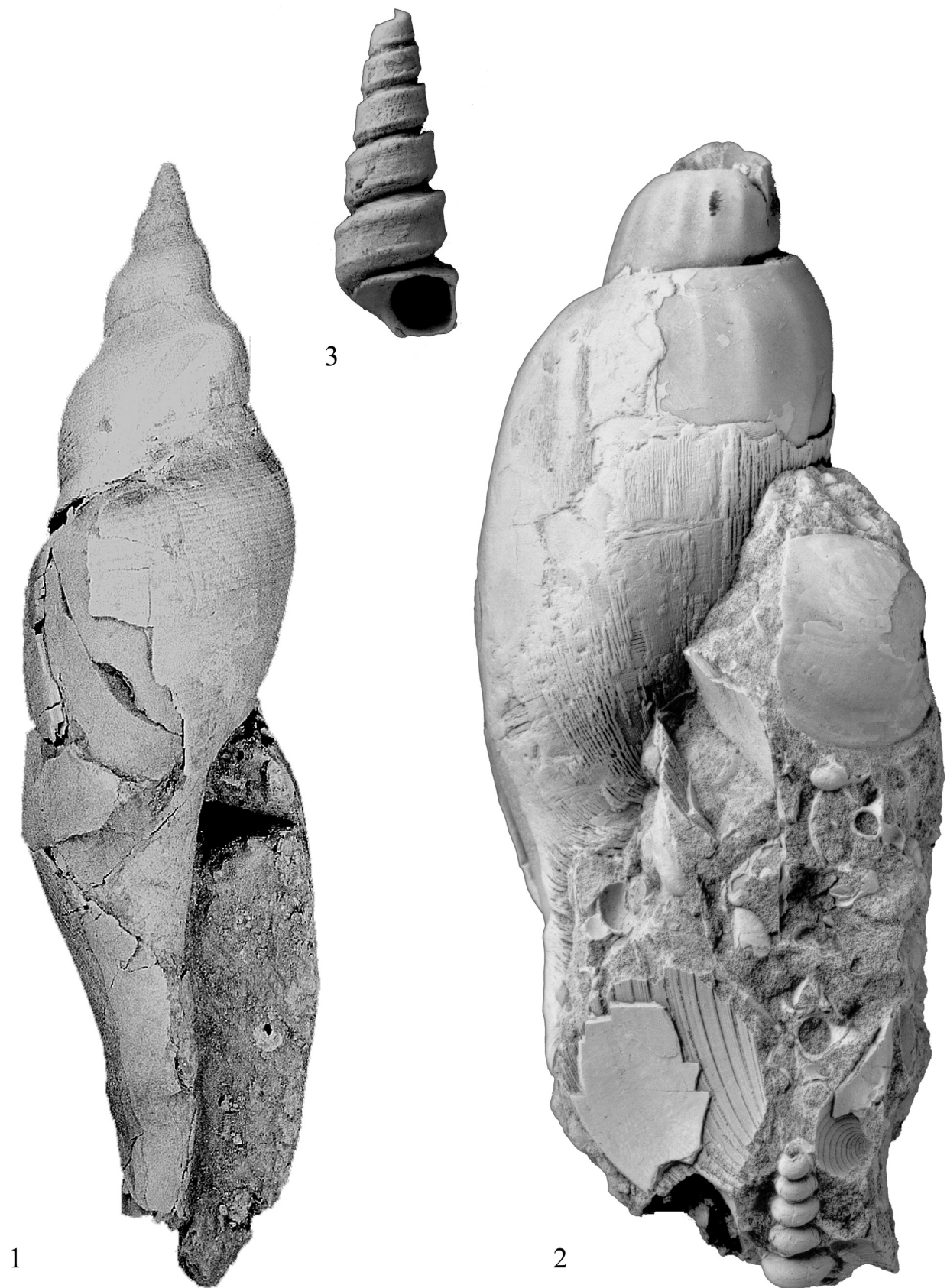


Plate 18 Figs 1–2 *Adelomelon alta* (Sowerby, 1846). **1**, Neotype SGO.PI.6274 (height = 195 mm). **2**, Non-type specimen NHM-G25287 (height 195 mm). **Fig. 3** '*Turritella*' *ambulacrum* Sowerby, 1846. Syntype NHM-G26359–63 (height = 28.2 mm).

Plio–Pleistocene near Coquimbo. It seems that d'Orbigny's material comes from an unknown locality of uncertain – presumably Miocene – age.

ambiguus Sowerby, 1846 [*Monoceros*]

Acanthina unicornis (Bruguière, 1789) (Pl. 17, figs 13–14)

- *1789 *Buccinum unicolorne* Bruguière: 254.
- 1816 *Monoceros crassilabrum* Lamarck: pl. 396, figs 2a, b.
- 1835 *Monoceros acuminata* Sowerby: 50.
- 1835 *Monoceros citrinum* Sowerby: 51.
- 1835 *Monoceros costatum* Sowerby: 50.
- 1835 *Monoceros globulus* Sowerby: 50.
- 1839 *Monoceros unicolorne*; Gray: 124.
- v1846 *Monoceros ambiguus* Sowerby: 261, pl. 4, figs 66–67.
- 1852 *Monoceros ambiguus* Sowerby in Darw., 1846; d'Orbigny: 79.
- v1854 *Monoceros unicolorne* Sowerby; Hupé: 194.
- v1887 *Monoceros crassilabris* Brug.; Philippi: 56, pl. 6, fig. 6.
- v1887 *Monoceros ambiguus* Sow.; Philippi: 56, pl. 7, fig. 1.
- 1951 *Nucella (Acanthina) crassilabrum*; Carcelles & Williamson: 291.
- 1954 *Nucella (Acanthina) crassilabrum* (Lam.); Carcelles: 257, pl. 1, figs 1–4.
- v1969 *Nucella (Acanthina) crassilabrum crassilabrum* (Lamarck); Herm: 138, pl. 17, figs 4a, b, 6a, b.
- v1969 *Nucella (Acanthina) crassilabrum calcar* (Martyn); Herm: 139, pl. 17, figs 7–9.
- v1969 *Nucella (Acanthina) crassilabrum acuminata* (Sowerby); Herm: 140, pl. 17, figs 5a, b.
- 1971 *Acanthina crassilabrum* (Lamarck, 1816); Dell: 210.
- 1985 *Acanthina monodon crassilabrum* (Lamarck, 1789); Wu: 58, figs 15–17, 23, 35–37, 50–51, 59, 71.
- 2003 *Acanthina unicornis* (Bruguière, 1789); DeVries: 334, figs 8–22.

TYPE MATERIAL. Holotype: NHM-G26378 (Coquimbo).

TYPE LOCALITY. Coquimbo, ?Pliocene.

REMARKS. DeVries (2003) distinguished two Recent species, *Acanthina monodon* (Pallas, 1774) and *Acanthina unicornis* – into which the holotype of *Monoceros ambiguus* falls – and provided a detailed description and discussion. *Acanthina unicornis* is known to occur from the Late Pliocene to Recent of southern Peru to southern Chile (DeVries 2003).

ambulacrum Sowerby, 1846 [*Turritella*]

'*Turritella*' *ambulacrum* Sowerby, 1846 (Pl. 18, fig. 3)

- v*1846 *Turritella ambulacrum* Sowerby: 257, pl. 3, fig. 59.
- ?1999 *Turritella ambulacrum* Sowerby, 1846; Frassinetti & Covacevich: 45, pl. 9, fig. 8.

TYPE MATERIAL. Five syntypes (not individually numbered): NHM-G26359, NHM-G26360, NHM-G26361, NHM-G26362 and NHM-G26363 (Santa Cruz).

TYPE LOCALITY. All five syntypes are labelled 'Santa Cruz, Patagonia'. However, Sowerby (1846: 257) stated Santa Cruz and Port San Julián, Patagonia as the localities. As he mentioned Santa Cruz in the first instance, the figured specimen

is probably from there. Most probably it is the reddish specimen present in the lot of syntypes, as the aperture agrees fairly well (see Plate 18, fig 3). This specimen, however, consists of only five whorls and the three additional early whorls in the figure are reconstructed.

REMARKS. Sowerby also mentioned San Julián as a locality for this species (the figured specimen is presumably from Santa Cruz), but it remains unclear from what horizon it comes. South American turritellids are badly in need of revision, so the generic placement – while certainly not *Turritella* s.s. – must remain uncertain at present. The other species described by Sowerby from Chile, *Turritella suturalis* (= *T. pseudosuturalis* d'Orbigny, 1852), seems to be distinct.

antiquata d'Orbigny, 1842 [*Chilina*]

Chilina antiquata d'Orbigny, 1842

- *1842 *Chilina antiquata* d'Orbigny: 114.
- 1852 *Chilina antiqua* d'Orb., 1847; d'Orbigny: 27.

TYPE MATERIAL. Syntypes could not be located in the collections of the MHNH in Paris and they are probably lost.

TYPE LOCALITY. '... aux Barrancas al Sur, rive droite du Río Negro' (... At Barrancas al Sur, left bank of the Río Negro).

REMARKS. These shells were neither described nor illustrated by d'Orbigny, because of the poor material he had available. He was sure, though, that they belonged in *Chilina*. The name must remain a *nomen nudum*. Parodiz (1969) noted that 'this species was never figured (...) and apparently it has not been collected since d'Orbigny'.

armatum Hupé, 1854 [*Triton*]

Sassia armata (Hupé, 1854) (Pl. 17, figs 11–12)

- v*1854 *Triton armatum* Hupé: 182–183, pl. 3, fig. 1.
- v1887 *Tritonium verruculosum* Sow.; Philippi: 53 (*partim*), pl. 4, fig. 10.
- v1887 *Tritonium exiguum* Philippi: 54, pl. 3, fig. 23 (*partim*).
- v1979 '*Tritonium*' *verruculosum* Sow.; Tavera: 90, pl. 19, fig. 67 (*non* Sowerby, 1846).
- v2007 *Sassia armata* (Hupé); Finger *et al.*: fig. 12F.

TYPE MATERIAL. The holotype is present in the Typothèque of the Laboratoire de Géologie under catalogue number MNHN-Gg2001/21.

TYPE LOCALITY. 'Terrenos terciarios de Coquimbo' (Tertiary beds of Coquimbo). The collection catalogue also states 'Port de Coquimbo' as locality. *Sassia armata* is not known from the Pliocene/Pleistocene deposits around Coquimbo. It is, however, fairly frequent in the Navidad Formation. The type locality must therefore remain doubtful.

REMARKS. *Sassia armata* has been regarded as a synonym of *Ameranella verruculosa* (Sowerby, 1846) by many authors (*e.g.* Philippi 1887). However, the two species are quite distinct. Both species will be reviewed by A. G. Beu, who pointed out to us that this species must be placed in *Sassia*.

blainvillei d'Orbigny, 1842 [*Monoceros*]

Chorus blainvillei (d'Orbigny, 1842) (Pl. 19, figs 1–3)

- v*1842 *Monoceros blainvillei* d'Orbigny: 116–117.
- v1842 *Monoceros Blainvillii* d'Orbigny, pl. 6, figs 18, 19.

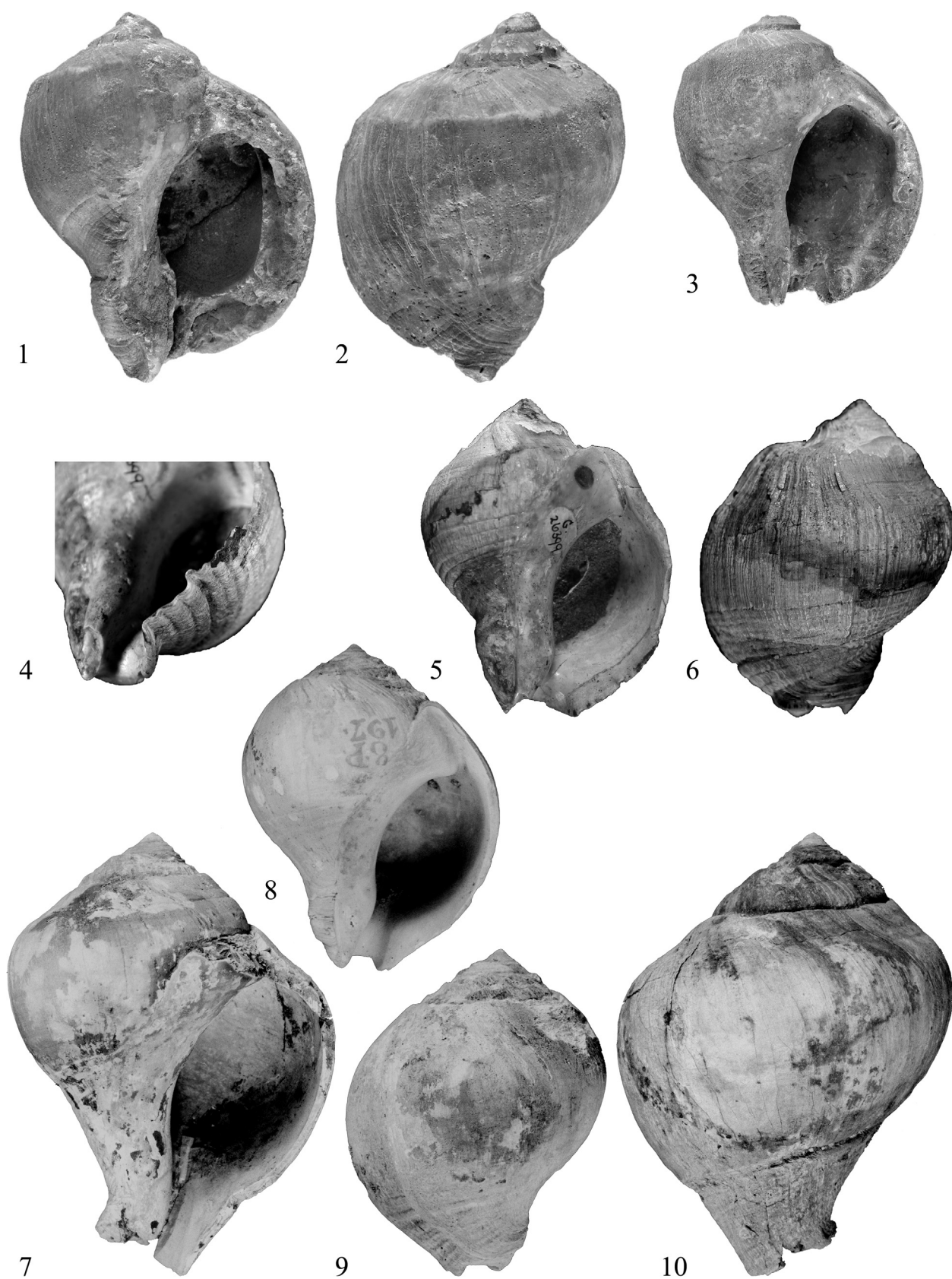


Plate 19 Figs 1–3 *Chorus blainvillei* (d'Orbigny, 1842). 1–2, Syntype 1 MNHN-R63175 (height = 66 mm). 3, Syntype 2 MNHN-R63175 (height = 57.5 mm). Figs 4–10 *Testallium cepa* (Sowerby, 1846). 4–6, Holotype NHM-G26339 (height = 57 mm). 7, 10, Holotype of *Fusus labialis* Hupé, 1854 MNHN-Gg2002/71 (height = 79.8 mm). 8–9, Syntype of *Fusus opimus* Hupé, 1854 MNHN-Gg2002/70 (height 58.3 mm).

- 1854 *Monoceros Blainvillei*; Hupé: 197–198.
 v1887 *Monoceros Blainvillei* D'Orb.; Philippi: 58, pl. 5, figs 2, 3.
 1896 *Monoceros Blainvillei* d'Orb. var. *nodosus* Mör.; Möricke: 563.
 v1969 *Chorus blainvillei blainvillei* (d'Orb.); Herm: 133, pl. 15, figs 1a, 1b.
 v1969 *Chorus blainvillei nodosa* (Möricke); Herm: 133, pl. 16, figs 1, 2.
 1997a *Chorus blainvillei* (d'Orbigny, 1842); DeVries: 137, pl. 2, fig. 5, pl. 3, figs 5–7.

TYPE MATERIAL. Two syntypes are present in the Typothèque of the Laboratoire de Paléontologie under number MNHN-R63175.

TYPE LOCALITY. 'J'ignore d'où elle vient. Elle m'a été donnée en Bolivie, comme des côtes du Pérou. Peut être se trouve-t-elle à Payta' (I don't know where it comes from. It has been given to me in Bolivia as coming from Peru. Maybe it comes from Paita). 'Probably Quebrada Cardo Grande, about 4 km north of Amotape, Peru' (DeVries 1997a: 137).

REMARKS. The genus *Chorus* Gray, 1847 (type species *Monoceros giganteus* Lesson, 1830), including this species, has been revised by DeVries (1997a), who gave a late Pliocene to probably earliest Pleistocene age for this species.

cepa Sowerby, 1846 [*Gastridium*]

Testallium cepa (Sowerby, 1846) (Pl. 19, figs 4–10)

- v*1846 *Gastridium Cepa* Sowerby: 261, pl. 4, figs 68, 69.
 1852 *Monoceros cepa* d'Orb., 1847; d'Orbigny: 79.
 v1854 *Monoceros labiale* Hupé: 199–200, pl. 3, fig. 3 (as *Fusus*).
 v1854 *Monoceros opimum* Hupé: 200, pl. 2, fig. 6 (as *Fusus*).
 v1887 *Monoceros labialis* Hup.; Philippi: 58, pl. 5, fig. 1.
 v1887 *Gastridium cepa* Sow.; Philippi: 59–60, pl. 6, fig. 2.
 v1887 *Gastridium opimum* (Hup.); Philippi: 60, pl. 57, fig. 7.
 v1972 *Chorus aff. C. blainvillei* (d'Orbigny, 1842); Fleming in Watters & Fleming: 398, pl. 28, fig. 6u.
 v1979 *Gastridium cepa* Sow.; Tavera: 97, pl. 20, figs 74, 75.
 1985 *Gastridium cepa* Sow.; Tavera *et al.*: pl. 2, figs 21, 22.
 v1997 *Testallium cepa* (Sowerby, 1846); Vermeij & DeVries: 25–26, fig. 1.
 v2003 *Testallium cepa* (Sowerby, 1846); Nielsen & Frassinetti: 95, figs 2–4, 6, 9, 12, 15, 17, 18, 20.
 v2007 *Testallium cepa* (Sowerby); Finger *et al.*: fig. 12K.

TYPE MATERIAL. Holotype of *Gastridium cepa*, NHM-G26339 (Navidad); holotype of *Fusus labialis*, MNHN-Gg2002/71 (Topocalma); three syntypes of *Fusus opimus* MNHN-Gg2005/11 (Topocalma); one syntype of *Fusus opimus*, MNHN-Gg2002/70 (Topocalma).

TYPE LOCALITY. Navidad, Navidad Formation, Miocene, Central Chile.

REMARKS. This is the type species of *Testallium* Vermeij & DeVries, 1997. The taxonomic status and affinities of this species have been discussed by Vermeij & DeVries (1997)

and the synonymy with *Fusus labialis* and *Fusus opimus* was confirmed by Nielsen & Frassinetti (2003) based on the type material. The specimen of Fleming (*in* Watters & Fleming 1972) has also been examined and synonymy is confirmed.

chilensis Sowerby, 1846 [*Turritella*]

Incatella chilensis (Sowerby, 1846) (Pl. 20, figs 1–2)

- v*1846 *Turritella Chilensis* Sowerby: 257, pl. 4, fig. 51.
 1852 *Turritella chilensis* Sowerby in Darw., 1846; d'Orbigny: 33.
 v1887 *Turritella chilensis* Sow.; Philippi: 72, pl. 9, fig. 6.
 1985 *Turritella chilensis* Sow.; Tavera *et al.*: pl. 2, figs 8, 9.
 v2000 *Turritella chilensis* Sowerby, 1846; Frassinetti: 134, pl. 1, figs 1–3.
 2007 *Incatella chilensis* (Sowerby, 1846); DeVries: 115, fig. 3.8.

TYPE MATERIAL. Three pieces of matrix with several syntypes: NHM-G26418, NHM-G26419, NHM-G26420 (Isla Mocha).

TYPE LOCALITY. Isla Mocha, late Miocene?, Central Chile.

REMARKS. *Incatella chilensis* is intermediate between *I. affinis* (Hupé, 1854) (= *I. hupei* Nielsen in DeVries, 2007) and *I. cingulatiformis* (Möricke, 1896). This species lineage was recently reviewed and redescribed by DeVries (2007) who, on the grounds of better and more material, was able to distinguish the involved species satisfactorily.

chiloensis Hupé, 1854 [*Oliva*]

Oliva chiloensis Hupé, 1854 (Pl. 20, figs 3–4)

- v*1854 *Oliva chiloensis* Hupé: 218.

TYPE MATERIAL. Two syntypes housed in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/51.

TYPE LOCALITY. 'Cerca de Cucao' (Near Cucao, Chiloé).

REMARKS. Hupé did not formally describe this species, because of the poor preservation of the material. However, he did state its difference with *Oliva simplex* in having a proportionally shorter spire ('... parece vecina de nuestra *O. simplex*; pero ofrece en las proporciones de su espira más corta diferencias bien apreciables'), so this name is available. *Oliva chiloensis* is probably ancestral to the Pliocene–Recent Chilean *Oliva peruviana* Lamarck, 1811 which is much larger. *Oliva chiloensis* has also been found at Ranquil on Arauco Peninsula (our unpublished data).

clathratus Hupé, 1854 [*Fusus*]

Aeneator? cleryanus (d'Orbigny, 1842) (Pl. 20, figs 5–9)

- v1854 *Fusus clathratus* Hupé: 174, pl. 2, fig. 9 (junior primary homonym of *F. clathratus* Deshayes, 1835).
 1887 *Fusus Hupeanus* Philippi: 48, pl. 2, fig. 18 (from Hupé) (*nomen novum*).

TYPE MATERIAL. One syntype of *Fusus clathratus* in the Typothèque of the Laboratoire de Géologie, under number MNHN-Gg2002/68. In the catalogue accompanying the collection (Catalogue 8P number 196 – Topocalma) there are three syntypes recorded but only one is present.

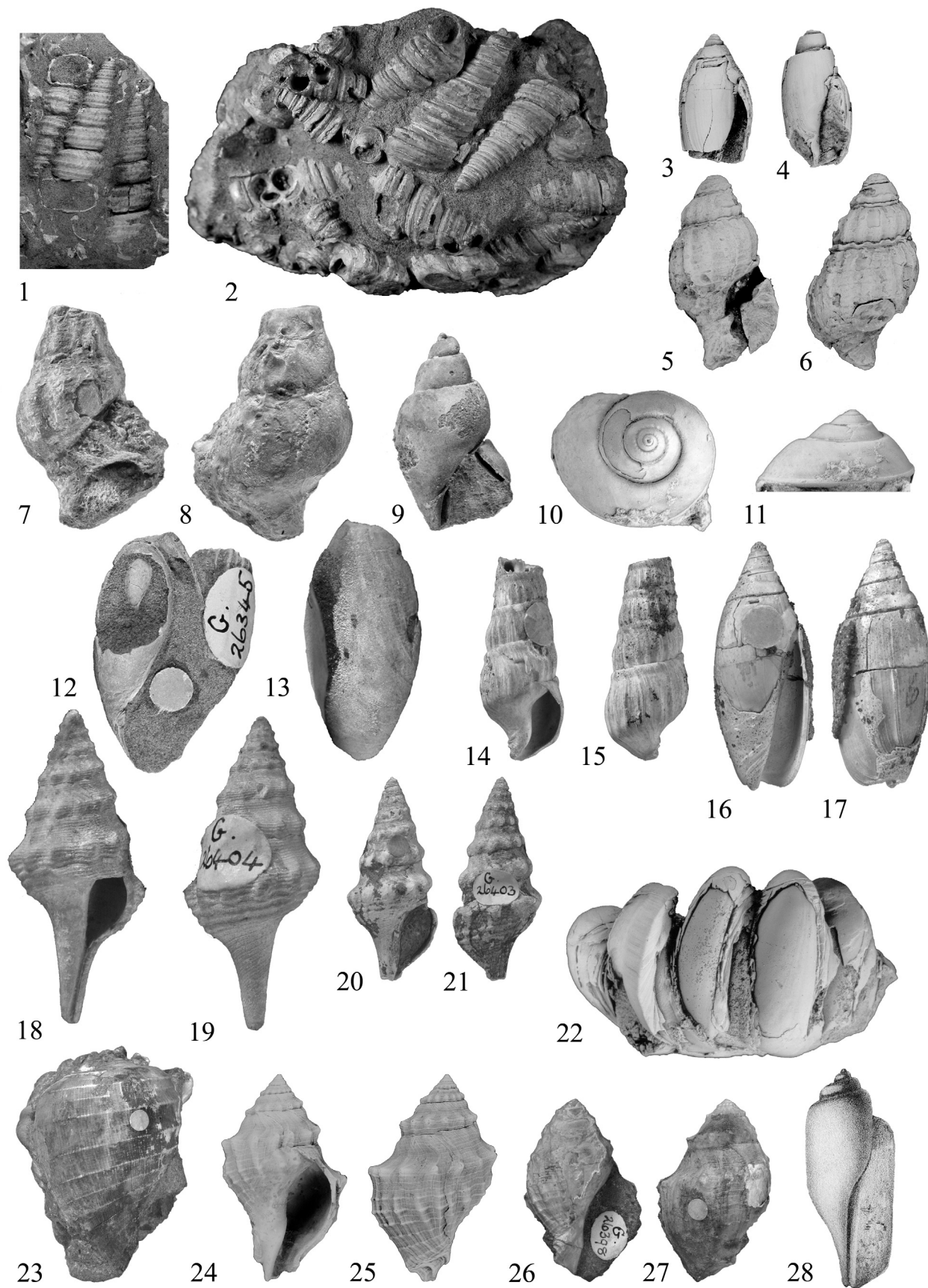


Plate 20 Figs 1–2 *Incatella chilensis* (Sowerby, 1846). 1, Syntypes NHM-G26419 (height of specimens = 32 mm each). 2, Syntypes NHM-G26418 (length of sample = 81 mm). Figs 3–4 *Oliva chiloensis* Hupé, 1854. 3, Syntype 1 MNHN-Gg2002/51 (height = 23.5 mm). 4, Syntype 2 MNHN-Gg2002/51 (height = 25 mm). Figs 5–9 *Aeneator? cleryanus* (d'Orbigny, 1842). 5–6, Syntype of *Fusus clathratus* Hupé, 1854, MNHN-Gg2002/68 (height = 36.1 mm). 7–8, Lectotype of *Aeneator? cleryanus* (d'Orbigny, 1842), MNHN-Ro9521 (height = 43 mm). 9, Paralectotype MNHN-Ro9522 (height = 37 mm). Figs 10–11 *Valdesia collaris* (Sowerby, 1846). Syntype NHM-G26397 (diameter = 30 mm).

TYPE LOCALITY. 'Terrenos terciarios de Cahuil, provincia de Colchagua' (Tertiary of Cahuil, province of Colchagua, i.e. Navidad).

REMARKS. The only remaining syntype agrees well with *Fusus cleryanus*, of which it is considered a synonym (see entry under *cleryanus* d'Orbigny, 1842 [*Fusus*], below).

***cleryanus* d'Orbigny, 1842 [*Fusus*]**

Aeneator? cleryanus (d'Orbigny, 1842) (Pl. 20, figs 5–9)

- v*1842 *Fusus cleryanus* d'Orbigny: 117, pl. 12, figs 6–9.
- v1854 *Fusus clathratus* Hupé: 174, pl. 2, fig. 9 (junior primary homonym of *F. clathratus* Deshayes, 1835).
- v1887 *Fusus Cleryanus* D'Orb.; Philippi: 42, pl. 2, fig. 12.
- 1887 *Fusus Hupeanus* Philippi: 48, pl. 2, fig. 18 (from Hupé) (*nomen novum*).

TYPE MATERIAL. Two syntypes of *Fusus cleryanus* in the Typothèque of the Laboratoire de Paléontologie, both figured: MNHN-R09521 is here designated as the lectotype; MNHN-R09522 becomes a paralectotype.

TYPE LOCALITY. '...dans les grès tertiaires à gros grains des environs de Coquimbo (Chili)' (... in the coarse grained sands around Coquimbo (Chile)). The sediment is hard grey-brown calcareous sandstone and does not belong to the Plio–Pleistocene sediments exposed in that region. Since the type material of *Fusus clathratus* is supposed to come from the Navidad Formation, the age is considered as Miocene.

REMARKS. The only syntype of *Fusus clathratus* agrees well with the lectotype of *Fusus cleryanus*. The paralectotype of *Fusus cleryanus* is an internal mould and not even referable to a family. *Fusus hupeanus* has been introduced by Philippi (1887) as a replacement name for *Fusus clathratus* Hupé, 1854 because that name is preoccupied by *Fusus clathratus* Deshayes, 1835. Through synonymisation of Hupé's species with *Fusus cleryanus*, Philippi's name also becomes a synonym. Because of general shell shape and ornamentation this species is tentatively referred to the genus *Aeneator* Finlay, 1926 (type species *Verconella marshalli* Murdoch, 1924).

***collaris* Sowerby, 1846 [*Trochus*]**

Valdesia collaris (Sowerby, 1846) (Pl. 20, figs 10–11)

- v*1846 *Trochus collaris* Sowerby: 256, pl. 3, figs 44, 45.
- v1902 *Gibbula laevis* (Sowerby); Ortmann: 170, pl. 31, fig. 8.
- v1987 *Valdesia (Juliania) collaris* (Sow.); Morra & del Río: 87, pl. 2, figs 3a–c.
- v1999 *Trochus laevis* Sowerby, 1846; Frassinetti & Covacevich: 45, pl. 9, figs 5–9.

TYPE MATERIAL. There is one syntype in the NHM under number NHM-G26397. The other material referred to this species by Sowerby could not be located in the Darwin Collection at the NHM. As discussed below, the lost specimen from Navidad was probably a juvenile of *Astele chilensis* (d'Orbigny, 1852). In order to fix the status of this species we designate specimen NHM-G26397 as lectotype of *Valdesia collaris* (Sowerby, 1846).

TYPE LOCALITY. Santa Cruz, Argentina and Navidad, Chile. However, the remaining syntype is from Santa Cruz so – as this one is the designated lectotype – the type locality is restricted to Santa Cruz.

REMARKS. The first species referable to *Valdesia* described from the Patagonian Tertiary was *Trochus collaris* Sowerby, 1846 (p. 613, pl. 3, figs 44–45). This species was reported by Sowerby from Navidad and Santa Cruz. The specimen (NHM-G26937) he figured in pl. 3, fig. 45 reads Navidad on the label. However, according to handwriting on the original label by Martin Doello Jurado it comes from Santa Cruz, a locality also confirmed on the same label by W. J. Zinsmeister. We agree with the opinion that this specimen comes from Santa Cruz and not from Navidad. Sowerby's specimen from Navidad seems lost and appears to have been a juvenile of *Astele chilensis*, as already suspected by Sowerby himself who believed it might have been a juvenile stage of *Trochus laevis*, which he collected only in Navidad (Chile). Philippi (1887) agreed with Sowerby on this issue and synonymised the two species, which were later placed under *Gibbula* by Tavera (1979). However, the shells from Navidad and Santa Cruz are, in fact, quite different and can not be placed under the same specific name. The specimens from Santa Cruz have an almost smooth shell with only a row of faint tubercles immediately below the suture and very faint spiral cords on the early teleoconch whorls. The periphery of the shell is bicarinate, visible as such only on the last whorl. The base has about 10 spiral cords, of which the three or four nearest to the umbilicus are the strongest. Furthermore, the whorls in *Astele chilensis* (= *Trochus laevis* Sow.) are more weakly inflated than in *Valdesia collaris*. Until all the fossil materials of these species are better known, it is preferable to use *Valdesia collaris* for the material from Santa Cruz and *Astele chilensis* for the material from Navidad.

***cosmophila* Sowerby, 1846 [*Bulla*]**

Kaitoa cosmophila (Sowerby, 1846) (Pl. 20, figs 12–13)

- v*1846 *Bulla cosmophila* Sowerby: 254, pl. 3, fig. 35.
- ?1995 *Scaphander* cf. *cosmophilus* (Sowerby, 1846); Frassinetti & Covacevich: 64, pl. 2, figs 17, 18.
- v2000 *Scaphander cosmophilus* (Sowerby, 1846); Frassinetti: 148, pl. 2, figs 19–21.

Figs 12–13 *Kaitoa cosmophila* (Sowerby, 1846). Holotype NHM-G26345 (height = 22 mm). **Figs 14–15** *Zeacuminia costellata* (Sowerby, 1846). Holotype NHM-G26343 (height = 18.4 mm). **Figs 16–17** *Lamprodomina dimidiata* (Sowerby, 1846). Syntype NHM-G26352 (height 22.6 mm). **Figs 18–21** *Gemmula (Ptychosyrinx) pseudodiscors* (d'Orbigny, 1852). **18–19**, Lectotype NHM-G26404 (height = 56.7 mm). **20–21**, Paralectotype NHM-G26403 (height = 36.6 mm). **Fig. 22** *Crepidula gregaria* Sowerby, 1846. Syntypes NHM-L27699 (height of stack = 60 mm, length of individuals up to 40 mm). **Fig. 23** *Ficus distans* (Sowerby, 1846). Lectotype NHM-G26334 (height = 42.9 mm). **Figs 24–27** *Austrotoma echinulata* (Hupé, 1854). **24–25**, Holotype MNHN-Gg2002/69 (height = 37.6 mm). **26–27**, Holotype of *Fusus turbinelloides* Sowerby, 1846 NHM-G26398 (height = 33.3 mm). **Fig. 28** *Oliva serena* d'Orbigny, 1842, from pl. 14, fig. 9 of d'Orbigny.

TYPE MATERIAL. Holotype NHM-G26345.

TYPE LOCALITY. Huafo Island (= Guafo), Chile. The locality is generally accepted to be Pliocene in age (e.g. Frassinetti 2000).

REMARKS. This species is referable to *Kaitoa* Marwick, 1931 (type species *Scaphander (Kaitoa) haroldi* Marwick, 1931), with fine spiral sculpture all over the shell. The shape of the shell is slightly more cylindrical than the very oval, *Scaphander*-like shell shown in the figure. This, together with the fine spiral sculpture all over the shell surface, suggests it fits better in *Kaitoa* than in *Scaphander* s.s. as suggested by Frassinetti & Covacevich (1995) and Frassinetti (2000). Frassinetti (2000) reported this species from Isla Guafo, Isla Guambelín and Tubul (Arauco), all these localities are regarded as early to late Pliocene in age. Whether the Recent Chilean *Scaphander interruptus* Dall, 1890 is closely related must be left open to an evaluation of a larger suite of material.

costellata Sowerby, 1846 [*Terebra*]

Zeacuminia costellata (Sowerby, 1846) (Pl. 20, figs 14–15)

- v*1846 *Terebra costellata* Sowerby: 262, pl. 4, figs 70, 71.
v1887 *Terebra costellata* Sow.; Philippi: 63, pl. 7, fig. 3.

TYPE MATERIAL. Holotype: NHM-G26343, a fragment.

TYPE LOCALITY. Navidad, Navidad Formation, Miocene, Central Chile.

REMARKS. This species resembles small species of *Zeacuminia* Finlay, 1930 (type species *Zeacuminia tahuia* Finlay, 1930) from New Zealand, with a weak subsutural groove (at ca. four-fifths whorl height on spire) and quite prominent, narrow axial costae below that; the aperture of the holotype is incomplete and the spire apex missing but we have collected complete specimens from Navidad.

dimidiata Sowerby, 1846 [*Oliva*]

Lamprodomina dimidiata (Sowerby, 1846) (Pl. 20, figs 16–17)

- v*1846 *Oliva dimidiata* Sowerby: 263, pl. 4, figs 76, 77.
v1854 *Oliva simplex* Hupé: 217, pl. 3, fig. 9.
v1887 *Oliva dimidiata* Sow.; Philippi: 69, pl. 8, fig. 14.
v1887 *Oliva pusilla* Philippi: 69, pl. 8, fig. 15.
1897 *Oliva dimidiata* Sow.; Philippi, pl. 10, fig. 3.
v1972 *Lamprodomina dimidiata* (Sowerby, 1846); Fleming in Watters & Fleming: 399, figs 6k, 6v.
v1979 *Oliva dimidiata* Sowerby, 1846; Tavera: 90, pl. 16, fig. 42.
v2007 *Lamprodomina dimidiata* (Sowerby); Finger *et al.*: fig. 12H.

TYPE MATERIAL. Five syntypes and 2–3 fragments: NHM-G26352, NHM-G26353, NHM-G26354, NHM-G26355 and NHM-G26356 (Navidad).

TYPE LOCALITY. Navidad, Navidad Formation, Miocene, Central Chile.

REMARKS. *Lamprodomina dimidiata* is the only member of the genus apart from the type species *L. neozelanica* (Hutton, 1885) from the middle Miocene to Pliocene of New

Zealand. It is well known from Navidad to Stokes Island, Chonos Archipelago, and usually very abundant where it occurs. *Lamprodomina dimidiata* is very similar to *L. neozelanica*, which is larger and more strongly shouldered.

discors Sowerby, 1846 [*Pleurotoma*]

Gemmula (Ptychosyrinx) pseudodiscors (d'Orbigny, 1852) (Pl. 20, figs 18–21)

- v*1846 *Pleurotoma discors* Sowerby: 258, pl. 4, fig. 54 (junior primary homonym of *P. discors* Sowerby, 1834 and *P. discors* Philippi, 1844).
1852 *Pleurotoma pseudo-discors* d'Orb., 1847; d'Orbigny: 65 (*nomen novum*).
v1979 *Pleurotoma santacruzensis*; Tavera: 89, pl. 18, fig. 55 (*non* Ihering, 1907).
v1992 *Ptychosyrinx* sp. nov.; Shuto: pl. 1, figs 4, 5.
v2000 *Gemmula* sp. 2; Frassinetti: 147.

TYPE MATERIAL. Two syntypes are present in the Darwin Collection: NHM-G26403 (Plate 20, figs 20–21) and G26404 (Plate 20, figs 18–19). However, these do not belong to the same species. G26404 is here selected as lectotype to clearly identify this species.

TYPE LOCALITY. Navidad, Navidad Formation, Miocene, Central Chile.

REMARKS. This species is assigned to *Ptychosyrinx* Thiele, 1925 (type species *Pleurotoma (Subulata) bisinuata* von Martens, 1901) – a subgenus of *Gemmula* Weinkauff, 1875 (type species *Pleurotoma gemmata* Reeve, 1843 (*non* Conrad, 1835) = *Gemmula hindsiana* Berry, 1958) because of its sculptural features, which resemble very much the Recent Chilean *G. (Ptychosyrinx) chilensis* Berry (1968), the only Recent eastern Pacific species of this subgenus. *Gemmula (Ptychosyrinx) pseudodiscors* is similar to some species of *Comitas* Finlay, 1926 (type species *Drillia fusiformis* Hutton, 1877) but we prefer to maintain this species in *Ptychosyrinx* until sinus position and protoconch are known from well preserved specimens.

distans Sowerby, 1846 [*Pyrula*]

Ficus distans (Sowerby, 1846) (Pl. 20, fig. 23)

- v*1846 *Pyrula distans* Sowerby: 259–260, pl. 4, fig. 61.
v1887 *Ficula distans* (*Pyrula*) Sow.; Philippi: 49, pl. 4, fig. 1.
v1980 *Ficus distans* (Sowerby, 1846); Covacevich & Frassinetti: 289–291, figs 3–5, 10.
v1983 *Ficus (Ficus) distans* (Sowerby); Covacevich & Frassinetti, fig. 9.
1997b *Ficus distans* (Sowerby, 1846); DeVries: 12, figs 3d, 3e.

TYPE MATERIAL. Three syntypes: NHM-G26334–6, all said to come from Navidad. However, G26336, a mould, belongs to another species and the sediment indicates that it also comes from a different locality. Probably it is a '*Ficus carolina* d'Orbigny, 1847' from Patagonia. To clarify the identity of this species, G26334 is here designated as the lectotype.

TYPE LOCALITY. Navidad, Navidad Formation, Miocene, Central Chile.

REMARKS. *Ficus distans* is a well known species and the reader is referred to Covacevich & Frassinetti (1980).

***echinulata* Hupé, 1854 [*Pleurotoma*]**

Austrotoma echinulata (Hupé, 1854) (Pl. 20, figs 24–27)

- v1846 *Pleurotoma turbinelloides* Sowerby: 258, pl. 4, fig. 53 (junior primary homonym of *P. turbinelloides* Reeve, 1846).
- v*1854 *Fusus echinulatus* Hupé: 173, pl. 2, fig. 3.
- v1887 *Fusus turbinelloides* (*Pleurotoma*) Sow.; Philippi: 44, pl. 2, fig. 17.
- 1896 *Fusus turbinelloides* Sow. sp.; Möricke: 570–571, pl. 11, figs 6, 7.
- 1985 *Megasurcula turbinelloides* Sow.; Tavera *et al.*: pl. 2, figs 17, 18.
- v2001 *Austrofusus turbinelloides* (Sowerby, 1846); Frassinetti: 81.

TYPE MATERIAL. The holotype of *Fusus turbinelloides* is specimen NHM-G26398. The holotype of *Fusus echinulatus* is housed in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/69 (Topocalma).

TYPE LOCALITY. Sowerby stated Navidad as the locality for this species. Hupé's specimen comes from the 'terrenos terciarios de Cauhuil (Colchagua)' (Tertiary of Cauhuil (Colchagua)). In both cases the material comes from the Miocene Navidad Formation.

REMARKS. This is a fairly typical, short-spined, coarsely sculptured *Austrotoma*. *Austrotoma echinulata* is similar to *Austrotoma echinata* Powell, 1942 but has a much stronger upper row of tubercles. As the work of Reeve (1846) was published in April and Darwin's (1846) – including the appendix by Sowerby – only in September, the next available name for this species is *Fusus echinulatus* Hupé, 1854, which is clearly a synonym.

***elegans* Hupé, 1854 [*Sigaretus*]**

Sinum subglobosum (Sowerby, 1846) (see Pl. 23, figs 22–23)

- v1854 *Sigaretus elegans* Hupé: 226, pl. 1, fig. 5 (junior primary homonym of *Sigaretus elegans* Blainville, 1827).

TYPE MATERIAL. Holotype of *Sigaretus elegans* housed in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/79 (Topocalma).

TYPE LOCALITY. 'Terrenos terciarios de la provincia de Colchagua, cerca de Topocalma' (Tertiary of the province of Colchagua, near Topocalma). Navidad, Navidad Formation, Miocene, Central Chile.

REMARKS. See remarks under *Sinum subglobosum* which is the senior synonym for this species.

***gaudichaudi* d'Orbigny, 1842 [*Rostellaria*]**

Ectinochilus? gaudichaudi (d'Orbigny, 1842) (see Pl. 22, figs 16–17)

- *1842 *Rostellaria gaudichaudi* d'Orbigny: 116, pl. 14, figs 6–8.

- 1928 *Ectinochilus gaudichaudi* d'Orbigny; Olsson: 71, pl. 16, figs 3, 4, 6, 7.

- 2004 *Ectinochilus gaudichaudi* (d'Orbigny, 1842); DeVries: 438, fig. 9.

TYPE MATERIAL. A thorough search through the collections in Paris did not reveal any possible type material. The type material must therefore be considered lost.

TYPE LOCALITY. 'à Payta, dans un grès tertiaire jaune-verdâtre, friable' (At Payta, in a greenish-yellow, friable Tertiary sand) Payta, Peru.

REMARKS. This species is known from late Eocene sediments of northern Peru (Olsson 1928) and southern Peru (DeVries 2004). Since the siphonal canal has never been observed completely preserved, the generic assignment remains tentative (DeVries 2004).

***gregarea* Sowerby, 1846 [*Crepidula*]**

Crepidula gregaria Sowerby, 1846 (Pl. 20, fig. 22)

- v*1846 *Crepidula gregarea* Sowerby: 254, pl. 3, fig. 34.
- 1977 *Crepidula gregaria* Sowerby; Hoagland: 379 (emended to *gregaria*).

TYPE MATERIAL. The figured specimen, NHM-L27699 includes six stacked syntypes. In addition, three formerly stacked specimens are syntypes NHM-L27700. The figured specimens are much less complete than in Sowerby's (1846: pl. 3, fig. 34) original illustration.

TYPE LOCALITY. Santa Cruz, Patagonia.

REMARKS. Sowerby used the name *gregarea* in the text but *gregaria* in his figure. Hoagland (1977: 379) selected *gregaria* as the correct spelling for the name.

This species may be different to the one from Navidad referred to by Philippi (1887: 88, pl. 12, fig. 1).

***kieneri* Hupé, 1854 [*Concholepas*]**

Concholepas kieneri Hupé, 1854 (Pl. 21, figs 1–3)

- v*1854 *Concholepas Kieneri* Hupé: 203, pl. 3, figs 4, 4a.
- v1969 *Concholepas nodosa* (Möricke); Herm, pl. 18, fig. 3 not of Möricke, 1896.
- 1995 *Concholepas kieneri* Hupé, 1854; DeVries: 286, figs 5, 10, 12, 13–16, 21, 22, 25.
- 2000 *Concholepas kieneri* Hupé, 1854; DeVries, figs 3, 7, 12.

TYPE MATERIAL. Two syntypes housed in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/86.

TYPE LOCALITY. 'Terrenos terciarios de Coquimbo' (Tertiary beds of Coquimbo, Chile).

REMARKS. *Concholepas kieneri* comes from Pliocene deposits near Coquimbo and has been sufficiently described and discussed by DeVries (1995, 2000). He also reported specimens from the Miocene and Pliocene of Peru (DeVries 1995). At that time, no information was available on the type material which was subsequently rediscovered and is figured here as photos for the first time.

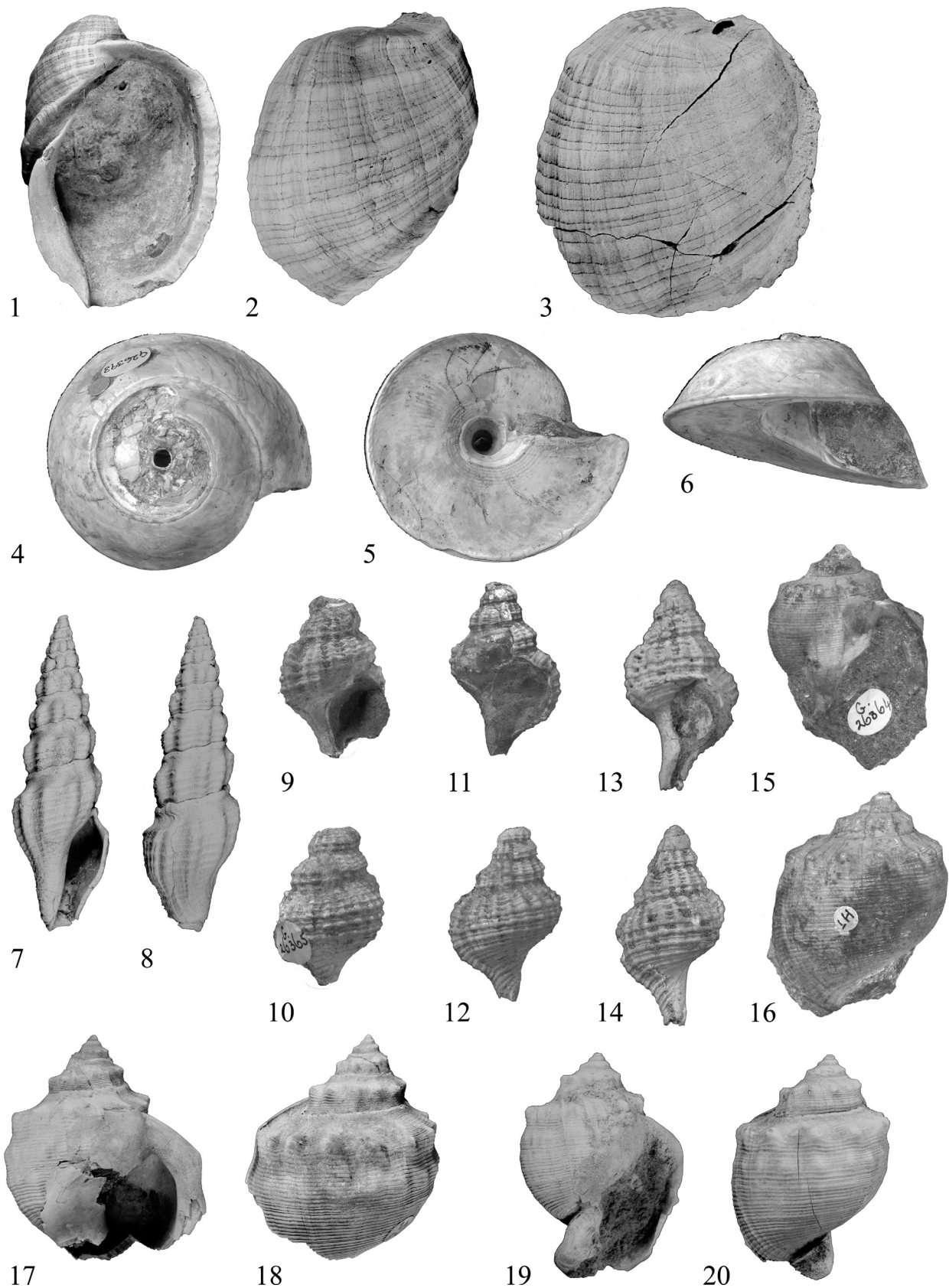


Plate 21 Figs 1–3 *Concholepas kieneri* Hupé, 1854. 1–2, Syntype1 MNHN-Gg2002/86 (height = 51.6 mm). 3, Syntype MNHN-Gg2002/86 (height = 55 mm). Figs 4–6 *Astele chilensis* (d'Orbigny, 1852). Holotype NHM-G26393 (diameter = 47 mm). Figs 7–8. *Inquisitor lingulacanthinus* new name. Neotype of *Pleurotoma lanceolata* (Hupé, 1854) SGO.PI.6280 (height = 27.5 mm). Figs 9–14 *Sassia leucostomoides* (Sowerby, 1846). 9–10, Paralectotype NHM-G26365 (height = 22.7 mm). 11–12, Lectotype NHM-G26337 (height 26 mm). 13–14, Paralectotype NHM-G26338 (height = 18.7 mm). Figs 15–20 *Echinophoria monilifera* (Sowerby, 1846). 15–16, Holotype NHM-G26364 (height = 37.7 mm). 17–18, Syntype 2 of *Cassidaria tuberculifera* Hupé, 1854 MNHN-Gg2002/52 (height = 47.7 mm). 19–20, Syntype 1 of *Cassidaria tuberculifera* Hupé, 1854 MNHN-Gg2002/52 (height = 41.3 mm).

labiale Hupé, 1854 [*Monoceros*]*Testallium cepa* (Sowerby, 1846) (Pl. 19, figs 7, 10)

v1854 *Monoceros labiale* Hupé: 199–200, pl. 3, figs 3, 3a (as *Fusus labialis*).

TYPE MATERIAL. Holotype of *Monoceros labiale* housed in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/71.

TYPE LOCALITY. ‘Topocalma y Cahuil, provincia de Colchagua, en las capas del terreno terciario’ (Topocalma and Cahuil, province of Colchagua, in the Tertiary beds). The catalogue lists only one specimen from Topocalma.

REMARKS. See entry herein under *cepa* Sowerby, 1846 [*Gastridium*], a senior synonym of this species.

laevis Sowerby, 1846 [*Trochus*]*Astele chilensis* (d’Orbigny, 1852) (Pl. 21, figs 4–6)

v*1846 *Trochus laevis* Sowerby: 256, pl. 3, figs 46, 47 (junior primary homonym of *T. laevis* Dillwyn, 1817, *T. laevis* Nilsson, 1827, and *T. laevis* Wood, 1828).

1846 *Trochus collaris* Sowerby: 256, from Navidad *non* Santa Cruz.

v1852 *Trochus chilensis* d’Orb., 1847; d’Orbigny: 44 (*nomen novum*).

v1887 *Trochus laevis* Sow.; Philippi: 95, pl. 12, fig. 5.

v1887 *Trochus fricki* Philippi: 95–96, pl. 12, fig. 7.

v1979 ‘*Trochus*’ (*Gibbula*) *laevis* Sow.; Tavera: 94.

v2004 *Astele chilensis* (d’Orbigny, 1852); Nielsen *et al.*: 84, 86, figs 60–69.

v2007 *Astele chilensis* (d’Orbigny); Finger *et al.*: fig. 12J.

TYPE MATERIAL. Holotype of *Trochus laevis*: NHM-G26393 (Navidad); two syntypes of *Trochus fricki* SGO.PI.810 (Lebu), SGO.PI.813 (Navidad).

TYPE LOCALITY. Navidad. The locality Lebu of Philippi (1887) is somewhat unclear but most probably refers to Caleta Ranquil, Peninsula Arauco. This species is quite frequent at both localities.

REMARKS. The name *Trochus laevis* is preoccupied several times and had been replaced by d’Orbigny (1852). That name, however, had been overlooked by all subsequent workers and was reintroduced by Nielsen *et al.* (2004). D’Orbigny also had one specimen in his collection, which is still present there under number 10292 and is labeled *Trochus chilensis*. Nielsen *et al.* (2004) discussed this species in detail and showed that it belongs in the Calliostomatidae.

lanceolata Hupé, 1854 [*Pleurotoma*]*Inquisitor lingulacanthinus* new name (Pl. 21, figs 7–8)

*1854 *Pleurotoma lanceolata* Hupé: 177, pl. 3, fig. 7 (junior primary homonym of *P. lanceolata* Reeve, 1845 (in 1843–1846) and *P. lanceolata* Michelotti, 1846).

1887 ?*Pleurotoma lanceolata* Hupé; Philippi: 35, pl. 1, fig. 11.

TYPE MATERIAL. After a thorough search, the type material has not been located in the collection of Gay/Hupé in Paris. A single *Pleurotoma* appears in the catalogue for the collection (8P-195) but only the accompanying sediment sample

(8P-194), a tuff from Topocalma, is present. The specimen reported by Philippi (1887) from Curauma could not be located in the SGO.PI. There appears to have been some confusion regarding the type locality for this species. While Hupé stated Coquimbo as locality for his specimen, according to Catalogue 8P-195 the specimen (now considered lost) comes from Navidad, which is consistent with the content of sample 8P-195 – a ‘tuff’ from Navidad. Furthermore, no similar species occurs in Coquimbo (Philippi 1887: 38; our unpublished results) but there is a species in the Navidad Formation at Navidad that agrees perfectly well with the original description and illustration. In order to objectively clarify the taxonomic status of this species, as well as the exact location of the type locality, we designate as neotype specimen, SGO.PI.6280, from the reddish sandstones at Punta Perro. This is a specimen that is 27.5 mm high, which, in all characters, agrees with the original description and illustration of Hupé.

TYPE LOCALITY. ‘Coquimbo, en las capas terciarias’ [Coquimbo, in the Tertiary beds (Chile)]. According to our neotype designation, the type locality should be redefined as the sandstone cliffs immediately south of Punta Perro, belonging to the Navidad Formation (locality PPN: Nielsen *et al.* 2004) and was dated by Finger *et al.* (2007) as late Miocene to early Pliocene.

REMARKS. Describing species is not the aim of this paper, so this species will be redefined elsewhere based on the neotype designated here and more than 100 additional specimens from the Navidad Formation. *Inquisitor lingulacanthinus* is quite different from the only other species from the Chilean Tertiary referable to *Inquisitor*, i.e. *Fusus ischnos* Philippi, 1887 so confusion is unlikely. *Pleurotoma lanceolata* Hupé, 1854 is a junior primary homonym of *Pleurotoma lanceolata* Reeve, 1845 (in 1843–1846) and *Pleurotoma lanceolata* Michelotti, 1846. The proposed replacement name *Inquisitor lingulacanthinus* is composed of *Lingula caninus* (latin) = headland of the dog, the literal translation of Punta Perro, where this species was found by us and which is the refined type locality.

leucostomoides Sowerby, 1846 [*Triton*]*Sassia leucostomoides* (Sowerby, 1846) (Pl. 21, figs 9–14)

v*1846 *Triton leucostomoides* Sowerby: 260, pl. 4, fig. 64.

v2000 *Sassia leucostomoides* (Sowerby, 1846); Frassinetti: 136, pl. 1, figs 11–14.

TYPE MATERIAL. Three syntypes: NHM-G26337, NHM-G26338 (smallest syntype, Sowerby’s pl. 4, fig. 64), NHM-G26365 (all Isla Guafo). According to A.G. Beu (pers. comm.) NHM-G26338 is a juvenile *Fusitriton*, not identifiable to species. To fix the status of this species we select NHM-G26337, a typical *Sassia leucostomoides*, as the lectotype.

TYPE LOCALITY. Isla Guafo, Pliocene, southern Chile.

REMARKS. Frassinetti (2000) cited quite a large suite of specimens present in the Museo Nacional de Historia Natural, Santiago, Chile, from the type locality. However, the matrix in the syntypes is hard sandstone, while Frassinetti’s specimens come from mudstone. One paralectotype

(NHM-G26338) has a large protoconch of about 4.2 slightly eroded whorls that show traces of spiral threads; the diameter and the height of the protoconch is 2.6 mm in each direction. Frassinetti's (2000) specimens have protoconchs of about 3.5–4 whorls, which seems to reflect intraspecific variation.

monilifer Sowerby, 1846 [Cassis]

Echinophoria monilifera (Sowerby, 1846) (Pl. 21, figs 15–20)

- v*1846 *Cassis monilifer* Sowerby: 260–261, pl. 4, fig. 65.
 v1854 *Cassidaria tuberculifera* Hupé: 209, pl. 3, fig. 2.
 v1887 *Cassis monilifera* Sow.; Philippi: 64, pl. 8, fig. 1 non fig. 2 (*nom. emend.*)
 1968 *Phalium (Xenophalium) moniliferum* (Sowerby, 1846); Abbott: 32.
 1985 *Cassis monilifera* Hupé; Tavera *et al.*: pl. 2, fig. 19.
 ?2000 *Semicassis* aff. *monilifera* (Sowerby, 1846); Frassinetti: 136, pl. 1, fig. 10.
 v2001 *Semicassis monilifera* (Sowerby, 1846); Frassinetti: 80–81.
 v2007 *Echinophoria monilifer* (Sowerby); Finger *et al.*: fig. 12M.

TYPE MATERIAL. Holotype of *Cassis monilifer*: NHM-G26364 (Navidad); two syntypes of *Cassidaria tuberculifera* are housed in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/52.

TYPE LOCALITY. Navidad, Navidad Formation, Miocene, Central Chile. Hupé (1854: 209) gave Coquimbo as the type locality for *Cassidaria tuberculifera*, but in the catalogue to the collection and on the label the locality is given as Cucao. This is consistent with our own collections from Coquimbo (yielding no cassids) and Cucao (common occurrence of this species).

REMARKS. The specimen figured as *Cassis tuberculifera* by Philippi (1887: pl. 8, fig. 2) does not belong in this species. The species name is correctly spelled '*monilifera*'.

noachinus Sowerby, 1846 [Fusus]

'*Fusus*' *noachinus* (Sowerby, 1846) (Pl. 22, figs 1–4)

- v*1846 *Fusus Noachinus* Sowerby: 259, pl. 4, figs 58–59.

TYPE MATERIAL. Two syntypes: NHM-G26400; NHM-G26401.

TYPE LOCALITY. Port San Julián, Patagonia.

REMARKS. This common species of Muricidae seems close to *Chorus giganteum*. However, its placement in *Chorus* is inadequate as the type specimens are lacking the characteristic labral tooth of this genus. It may belong in a new, as yet undescribed, genus of muricids common in Oligocene and Miocene rocks from southern South America.

opimum Hupé, 1854 [Monoceros]

Testallium cepa (Sowerby, 1846) (Pl. 19, figs 8–9)

- v1854 *Monoceros opimum* Hupé: 200, pl. 2, figs 6, 6a (as *Fusus opimus*).

TYPE MATERIAL. One syntype of *Monoceros opimum* is housed in the Typothèque of the Laboratoire de Géologie

under number MNHN-Gg2002/70; three syntypes of *Monoceros opimum* under number MNHN-Gg2005/11.

TYPE LOCALITY. 'Terrenos terciarios de Cahuil, provincia de Colchagua' [Tertiary of Cahuil, province of Colchagua].

REMARKS. See entry herein under *cepa* Sowerby, 1846 [*Gastridium*], a senior synonym of this species.

orbignyi Hupé, 1854 [Fusus]

'*Fusus*' *orbignyi* Hupé, 1854 (Pl. 22, figs 5–6)

- v*1854 *Fusus sulcatus* Hupé, pl. 3, fig. 5 (junior primary homonym of *F. sulcatus* Lamarck, 1816).
 v1854 *Fusus Orbignyi* Hupé: 175.

TYPE MATERIAL. Holotype housed in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/72.

TYPE LOCALITY. 'Cerca de Cahuil' [Near Cahuil, Chile]. Navidad, Navidad Formation, Miocene, Central Chile. Hupé published Cahuil as the locality but noted Topocalma in the catalogue; Topocalma is a locality near Navidad.

REMARKS. No material apart from the holotype is known. Assignment to a better fitting genus is not possible at the moment because more material is needed, including specimens with a preserved outer lip. After publishing the plates, Hupé noted that *Fusus sulcatus* was preoccupied by *F. sulcatus* Lamarck, 1816 and therefore renamed this species in the later appearing text.

orbignyi Hupé, 1854 [Natica]

Magnatica subsolida (d'Orbigny, 1852) (Pl. 22, figs 7–8)

- v1854 *Natica Orbignyi* Hupé: 224.

TYPE MATERIAL. The holotype is present in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/73 (Topocalma, height = 44 mm).

TYPE LOCALITY. 'Terrenos terciarios cerca de Topocalma, en la provincia de Colchagua' [Tertiary beds near Topocalma, in the province of Colchagua, Chile].

REMARKS. The holotype is a poorly preserved specimen that shows the two umbilical grooves mentioned by Hupé. A large suite of naticids from Navidad (collections in SGO.PI and ours) confirms it as a subjective synonym of *Natica solida* Sowerby, 1846 (= *N. subsolida* d'Orbigny, 1852). See entry under *solida* Sowerby, 1846 [*Natica*] herein for further comments.

ornata Sowerby, 1846 [Struthiolaria]

Perissodonta ornata (Sowerby, 1846) (Pl. 22, fig. 9)

- v*1846 *Struthiolaria ornata* Sowerby: 250, pl. 4, fig. 62.

TYPE MATERIAL. Syntype: NHM-G26392 (Santa Cruz).

TYPE LOCALITY. Santa Cruz and San Julián, Patagonia.

REMARKS. It appears that Sowerby (1846) had a variety of specimens from different localities, but the figured specimen seems to be from Santa Cruz, as suggested by the label in the NHM; the specimen, however, is missing from the Darwin Collection. This is in contradiction to Camacho & Zinsmeister's (1989: 105) statement that the 'holotype' was

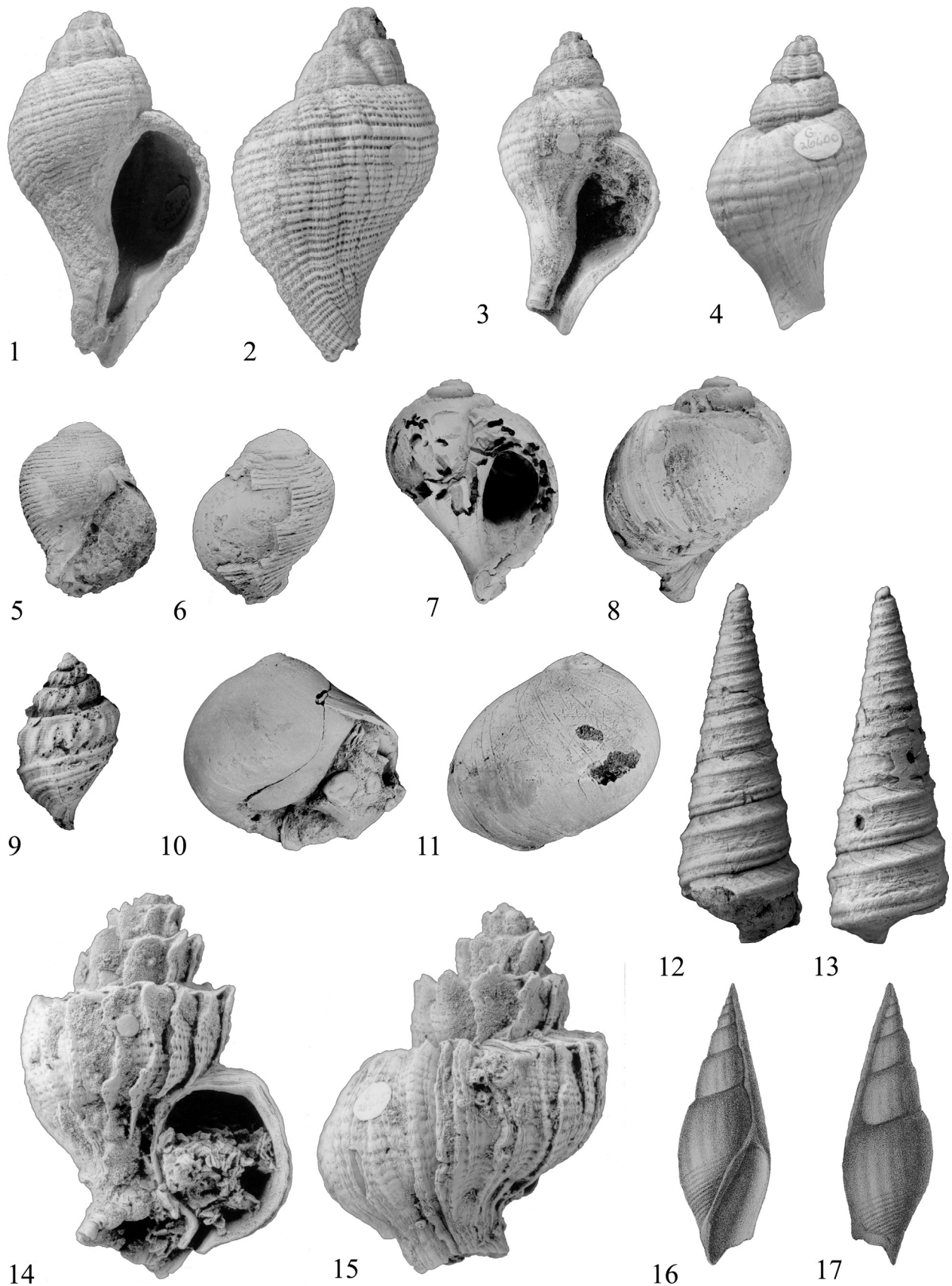


Plate 22 **Figs 1–4** *'Fusus' noachinus* Sowerby, 1846. **1–2**, Syntype NHM-G26401 (height = 63.7 mm). **3–4**, Syntype NHM-G26400 (height = 52.5 mm). **Figs 5–6** *'Fusus' orbignyi* Hupé, 1854. Holotype MNHN-Gg2002/72 (height = 30.9 mm). **Figs 7–8** *Magnatica subsolida* (d'Orbigny, 1852). Holotype of *Natica orbignyi* Hupé, 1854 MNHN-Gg2002/73 (height = 44 mm). **Fig. 9** *Perissodonta ornata* (Sowerby, 1846). Cast of syntype NHM-G26392 (height = 20 mm). **Figs 10–11** *Neverita (Glossaulax) pachystoma* (Hupé, 1854). Syntype MNHN-Gg2002/77 (height = 32 mm). **Figs 12–13** *Turritella patagonica* Sowerby, 1846. Syntypes NHM-G26408 (height = 31.8 mm). **Figs 14–15** *Trophon sowerbyi* Griffin & Pastorino, 2005. Syntype of *Fusus patagonicus* Sowerby, 1846 NHM-G26415 (height = 69 mm). **Figs 16–17** *Ectinochilus? gaudichaudi* (d'Orbigny, 1842), from pl. 14, fig. 7 of d'Orbigny.

an internal mold from the San Julián Formation at Cabo Curioso. No indication is given as to how they reached such a conclusion, but statements in the original publication by Sowerby leave no doubt about the existence of syntypes, rendering such a 'designation of lectotype by inference of holotype' invalid (ICZN 1999: Art. 74.5). In fact, Sowerby himself stated in the original description that 'Casts of a large variety are found in a loose clayey sandstone at Port San Julián', a statement that clearly indicates that the species (i.e., the 'typical' specimens) came from the Monte León Formation, which is also exposed around Port San Julián. However, a similar species also occurs in the San Julián Formation.

Thus, the main complication that clouds the identity of this taxon is the fact that the species from Santa Cruz (probably, although impossible to confirm as the material is missing in the Darwin Collection) – occurring there and at other localities including San Julián but always within the Monte León Formation – is different from the one common in the San Julián Formation. A lectotype designation would be necessary in order to unequivocally identify them both. Unfortunately, the specimen in the NHM is a very poorly preserved internal mould, which is very difficult to assign to either of the two species. Thus, an application to the ICZN (Art. 75.5) would be necessary in order to set that specimen aside and designate a neotype from the Monte León Formation, of which numerous well preserved specimens are available.

Cenozoic South American struthiolariids have been generally placed in the genus *Struthiolarella* Steinmann & Wilckens, 1908 (type species: *Struthiolaria ameghinoi* Ihering, 1897). However, we follow Powell (1951) and Nielsen (2005) in regarding *Struthiolarella* as a synonym of *Perissodonta* Martens, 1878 (type species *Struthiolaria mirabilis* Smith, 1875).

***pachystoma* Hupé, 1854 [*Natica*]**

Neverita (*Glossaulax*) *pachystoma* (Hupé, 1854) (Pl. 22, figs 10–11)

v*1854 *Natica pachystoma* Hupé: 223, pl. 1, figs 6, 6a.

v1887 *Natica pachystoma* Hupé; Philippi: 82, pl. 10, figs 1a–c.

v1979 '*Natica*' (*Polinices*) *pachystoma* Hupé; Tavera: 93, figs 51–52.

TYPE MATERIAL. Eight syntypes are housed in the Typothèque of the Laboratoire de Géologie, including one specimen from Cucao, Chiloé, under number MNHN-Gg2002/50 (height 26.4 mm) and seven specimens from Topocalma under number MNHN-Gg2002/77 (largest specimen, height = 32 mm).

TYPE LOCALITY. 'En los terrenos terciarios, cerca de Topocalma, en la provincia de Colchagua'. [In the Tertiary near Topocalma, in the province of Colchagua]. The type locality, therefore, would be the Navidad Formation at Topocalma, south of Navidad.

REMARKS. Having the typical callus depression, this species clearly belongs in *Glossaulax* Pilsbry, 1929. Several nominal species from Chile might fall in synonymy with *Natica pachystoma*. However, it is not yet clear whether it is one highly variable species (like the type species of *Glossaulax*, i.e. *Natica reclusiana* Deshayes, 1839) or a species complex.

***patagonica* Sowerby, 1846 [*Turritella*]**

'*Turritella*' *patagonica* Sowerby, 1846 (Pl. 22, figs 12–13)

v*1846 *Turritella Patagonica* Sowerby: 256, pl. 3, fig. 48.

2004b "*Turritella*" *patagonica* Sowerby, 1846; del Río: fig. 9.3.

TYPE MATERIAL. Two syntypes: NHM-G26408; NHM-G26409 (probably Port Desire).

TYPE LOCALITY. Puerto Deseado (Port Desire), Argentina. Darwin's Port Desire locality is somewhat uncertain. The material probably comes from the Tertiary beds exposed a few kilometres inland from the town, which did not exist at the time of his trip. His term 'Port' certainly refers to the natural harbour at the mouth of the Deseado river.

REMARKS. The age of this species remains uncertain, as 'Port Desire' could well mean either the late Oligocene–early Miocene 'Patagonian' beds or the Pliocene (?) sediments exposed in Cerro Laziar. Sowerby also mentions 'fragments from Navidad', but these were not located in the Darwin Collection. In order to fix the status of this species we designate specimen NHM-G26408 as the lectotype. This appears to be the specimen figured by Sowerby. Sowerby stated that he adopted the name (i.e. *patagonica*) following a suggestion by d'Orbigny (possibly in a personal communication). A specimen from Playa La Mina was figured by del Río (2004b). This species may belong in *Incatella* DeVries (2007), because of its resemblance to other South American species of this genus. However, we refrain from assigning it to this genus because early whorls are not available on the two syntypes so the development of spiral cords is not known. Later whorls have a secondary subsutural cord, followed by a primary immediately below, a wide interspace that may show 1–3 secondary cords and always has fine spiral threads, two closely spaced strong primary cords at the lower angulation and a secondary cord just next to the lower one at the base.

***patagonicus* Sowerby, 1846 [*Fusus*]**

Trophon sowerbyi Griffin & Pastorino, 2005 (Pl. 22, figs 14–15).

v*1846 *Fusus Patagonicus* Sowerby: 259, pl. 4, fig. 60 (junior secondary homonym of *Murex patagonicus* d'Orbigny, 1839; placed in *Trophon* by Pastorino 2005).

1897 *Trophon patagonicus* Sow.; Ihering: 296.

?1999 *Trophon* cf. *patagonicus* (Sowerby, 1846); Frassinetti & Covacevich: 50, pl. 10, figs 1–2.

v2005 *Trophon sowerbyi* new name; Griffin & Pastorino: 300 figs 5.1–5.15.

TYPE MATERIAL. Lectotype (of Griffin & Pastorino, 2005) NHM-G26415 (figured); paralectotypes NHM-G26416 and NHM-G26417.

TYPE LOCALITY. Port San Julián, Patagonia.

REMARKS. This species has been discussed amply in Griffin & Pastorino (2005) and the reader is referred there for further details.

petitianus* d'Orbigny, 1842 [*Fusus*]Penion petitianus* (d'Orbigny, 1842) (Pl. 23, fig. 1)

- v*1842 *Fusus Petitianus* d'Orbigny: 118, pl. 12, fig. 10.
 1854 *Fusus Petitianus*; Hupé: 172.
 v1887 *Fusus Petitianus* D'Orb.; Philippi: 43, pl. 2, fig. 13.
 v1969 *Fusinus petitianus* (d'Orb.); Herm: 142, pl. 14, fig. 4.

TYPE MATERIAL. Holotype: housed in the Typothèque of the Laboratoire de Paléontologie under number MNHN-R63173.

TYPE LOCALITY. '... dans les grès tertiaires à gros grains de Coquimbo (Chili)' [... within the coarse grained Tertiary sands at Coquimbo (Chile)]. The sediment is a hard grey-brown calcareous sandstone that does not belong to the Plio-Pleistocene sediments exposed in that region. The age and exact locality therefore remain unclear.

REMARKS. The figure in d'Orbigny (1842: pl. 12, fig. 10) is highly reconstructed. The specimen itself is a spire with part of the last whorl only, a small part of the neck and all covered with matrix. It is one of the several species of *Penion* common in the Tertiary of southern South America, this one with fairly simple sculpture.

pumila* Sowerby, 1846 [*Natica*]'Natica' pumila* Sowerby, 1846 (Pl. 23, fig. 15)

- v*1846 *Natica pumila* Sowerby: 254–255, pl. 3, fig. 28.
 v1887 *Natica pumila* Sow.; Philippi: 85, pl. 9, fig. 23.

TYPE MATERIAL. The holotype could not be located in the Darwin Collection and is deemed to be lost.

TYPE LOCALITY. Chiloé, eastern coast. There are only very small outcrops known on the eastern coast of Chiloé while at the western coast near Cucao are impressive cliffs of Late Miocene age. Darwin (1846) gave Lemuy as the type locality. Sowerby noted that it occurs together with *Natica striolata* Sowerby, 1846, which is fairly frequent at Cucao. The age of these eastern outcrops is therefore the same as those on the western coast, which have been assigned a late Miocene to early Pliocene age (Finger *et al.* 2007).

REMARKS. The identity of this species is unclear at present and must await a revision of the fauna from Chiloé. Better collections may prove that the name is valid, but until such studies are carried out and a neotype is designated we regard it as a *nomen dubium*.

pyruliformis* Sowerby, 1846 [*Fusus*]Peonza? pyruliformis* (Sowerby, 1846) (Pl. 23, fig. 2)

- v*1846 *Fusus pyruliformis* Sowerby: 258–259, pl. 4, fig. 56.
 v1887 *Fusus pyruliformis* Sow.; Philippi: 40, pl. 2, fig. 1.
 1896 *Fusus pyruliformis* Sow.; Möricke: 569–570, pl. 11, figs 1, 2.
 v1979 '*Fusus*' (*Murex*) *pyruliformis* Sow.; Tavera: 88, pl. 20, fig. 77.

TYPE MATERIAL. The holotype is housed in the Darwin Collection under number NHM-G26407.

TYPE LOCALITY. Navidad.

REMARKS. The only specimen is a fairly well preserved shell with three prominent spiral cords around the periphery, a smooth, wide, weakly concave sutural ramp and about 12 weaker cords on the base and canal; the succeeding whorl rides up onto the preceeding whorl to the periphery (base of the sutural ramp), so the spire is low and stepped and the shell seems to have a calcitic outer shell-layer. '*Fusus*' *pyruliformis* is tentatively placed in *Peonza* Olivera in Olivera *et al.*, 1994 (type species *Peonza torquata* Olivera in Olivera *et al.*, 1994) because it seems to be closely related to *Peonza benjamina* Olivera in Olivera *et al.*, 1994.

regularis* Sowerby, 1846 [*Fusus*]Penion subregularis* (d'Orbigny, 1852) (Pl. 23, figs 6–7)

- v*1846 *Fusus regularis*? Sowerby: 258, pl. 4, fig. 55 (junior primary homonym of *F. regularis* J. Sowerby, 1825).
 1852 *Fusus subregularis*? d'Orb., 1847; d'Orbigny: 69 (*nomen novum*).
 v1887 *Fusus Darwinianus* Philippi: 41, pl. 2, fig. 7 (*nomen novum*).
 1985 *Siphonalia darwini* Phil.; Tavera *et al.*: pl. 2, figs 10, 11, 14, 15.
 v2001 *Penion darwinianus* (Philippi, 1887); Frassinetti: 82–83, figs 12, 13.

TYPE MATERIAL. Holotype of *Fusus regularis*?: NHM-G26414 (Navidad).

TYPE LOCALITY. Navidad, Navidad Formation, Miocene, Central Chile.

REMARKS. *Fusus subregularis* d'Orbigny is a replacement name for *Fusus regularis* Sowerby, the type material of which is also the type material of *Fusus subregularis* (ICZN 1999: Art. 72.7). *Fusus darwinianus* was equally introduced as a replacement name for the same species by Philippi, obviously not having access to the work of d'Orbigny (1852). The 'type material' of Philippi, therefore, has no type status (ICZN 1999: Art. 72.2) even though it is labelled as such. Most specimens labelled as *Fusus darwinianus* in the Philippi Collection at the Museo Nacional in Santiago (Chile) are conspecific with *Fusus subregularis*. However, one of them (SGO.PI.554, Navidad) seems to belong to one of the other *Penion* species common at Navidad. Specimen SGO.PI.584 (Navidad) is labelled 'lectotipo' (lectotype), SGO.PI.4533, SGO.PI.4534 and SGO.PI.4535 (all from Navidad) are labelled 'paralectotipo' (paralectotype).

rouaultii* Hupé, 1854 [*Trochus*]Tegula atra* (Lesson, 1830) (*partim*) (Pl. 23, fig. 3)*Prisogaster niger* (Wood, 1828) (*partim*) (Pl. 23, figs 4–5)v1854 *Trochus Rouaultii* Hupé: 148–149.

TYPE MATERIAL. Two syntypes housed in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/101 (Coquimbo), neither were figured by Hupé (1854).

TYPE LOCALITY. 'Port de Huasco' [Coquimbo]. Most probably Pleistocene.

REMARKS. There are two specimens labelled as *Trochus rouaultii*, but one is listed in the catalogue as '*Trochus*

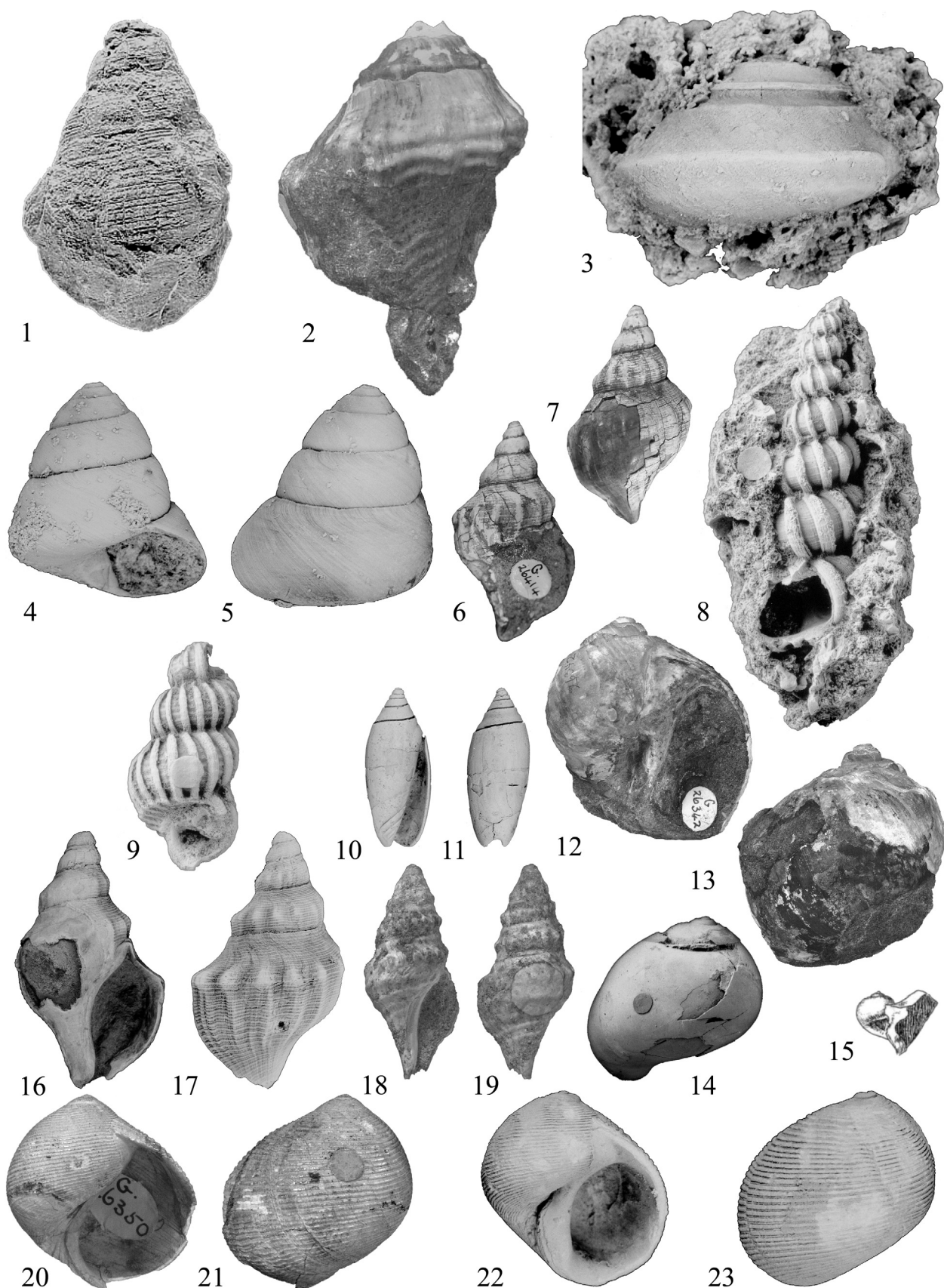


Plate 23 **Fig. 1** *Penion petitianus* (d'Orbigny, 1842). Holotype MNHN-R63173 (height = 55.7 mm). **Fig. 2** *Peonza? pyruliformis* (Sowerby, 1846). Holotype NHM-G26407 (height = 33.7 mm). **Fig. 3** *Tegula atra* (Lesson, 1830). Syntype Gg2002/101-2 of *Trochus rouaultii* Hupé, 1854. **Figs 4–5** *Prisogaster niger* (Wood, 1828). Syntype Gg2002/101-1 of *Trochus rouaultii* Hupé, 1854. **Figs 6–7** *Penion subregularis* (d'Orbigny, 1852). Holotype NHM-G26414 (height = 39.5 mm). **Figs 8–9** *Cirsotrema rugulosa* (Sowerby, 1846). **8**, Paralectotype NHM-G26347 (height = 50 mm). **9**, Lectotype NHM-G26346 (height = 26.8 mm). **Figs 10–11** *Lamprodomina dimidiata* (Sowerby, 1846). Syntype Gg2002/76 of *Oliva simplex* Hupé, 1854 (height = 18.7 mm). **Figs 12–13** *Magnatica subsolida* (d'Orbigny, 1852). Holotype NHM-G26342 (height = 42.8 mm).

luctuosus d'Orb'. Specimen MNHN-Gg2002/101-2 most probably belongs in the Recent *Tegula atra* (Lesson, 1830), while MNHN-Gg2002/101-1 belongs in the Recent *Prisogaster niger* (Wood, 1828). To our knowledge Hupé's name has never been used in the literature so it should not cause confusion.

***rugulosa* Sowerby, 1846 [*Scalaria*]**

Cirsotrema rugulosa (Sowerby, 1846) (Pl. 23, figs 8–9)

- v*1846 *Scalaria rugulosa* Sowerby: 255, pl. 3, figs 42, 43.
non 1887 *Scalaria rugulosa* Sow.; Philippi: 77, pl. 9, fig. 15.
 v1902 *Scalaria rugulosa* Sow.; Ortmann: 175, pl. 31, figs 11a–c.
 v1981 *Opalia rugulosa* (Sowerby, 1846); Zinsmeister: 1097, pl. 2, fig. 10.

TYPE MATERIAL. Three syntypes: NHM-G26346, NHM-G26347 and NHM-G26348.

TYPE LOCALITY. Port San Julián, Patagonia.

REMARKS. This is the common species of *Cirsotrema* Mörch, 1853a (type species *Scalaria varicosa* Lamarck, 1822) from the San Julián Formation. The two specimens figured by Sowerby (1846: pl. 3, figs 42, 43) appear to belong in different taxa. Sowerby himself seems to have had doubts as to their identity, as the figure captions for his plate 3 read: 'Fig 42, 43. *Scalaria rugulosa* & var.' In order to fix the status of the species and avoid misidentifications we designate as lectotype the specimen NHM-G26346, on which Sowerby's figure 42 was based. Records of *Scalaria rugulosa* from the Navidad Formation and its equivalents refer to a different species.

***serena* d'Orbigny, 1842 [*Oliva*]**

Oliva serena d'Orbigny, 1842 (Pl. 20, fig. 28)

- *1842 *Oliva serena* d'Orbigny: 116, pl. 14, fig. 9.

TYPE MATERIAL. Presumably lost. The specimen was not located in the collections at the MNHN.

TYPE LOCALITY. '...dans le grès tertiaires à gros grains quartzueux des environs de Coquimbo' [From the coarse grained Tertiary quartz sands around Coquimbo, Chile].

REMARKS. The holotype was an internal mould, as was the specimen mentioned by Möricke (1896: 572). Most probably it is a synonym of the extant *Oliva peruviana* Lamarck, 1811, which is common in the Pliocene/Pleistocene deposits around Coquimbo. The name *Oliva serena* is considered a *nomen dubium*.

***simplex* Hupé, 1854 [*Oliva*]**

Lamprodomina dimidiata (Sowerby, 1846) (Pl. 23, figs 10–11)

- v1854 *Oliva simplex* Hupé: 217, pl. 3, fig. 9.

TYPE MATERIAL. Nine syntypes are present in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/76 (Topocalma, figured height = 18.7 mm, maximum height = 25.3 mm).

TYPE LOCALITY. 'Arenas terciarias verdosas de la costa de Colchagua, cerca de Cauil' [Greenish Tertiary sands from the coast of Colchagua, near Cauil, Chile].

REMARKS. See remarks under entry of *dimidiata* Sowerby, 1846 [*Oliva*]. *Oliva simplex* comes from the Navidad Formation and is a synonym of this well known species.

***solida* Sowerby, 1846 [*Natica*]**

Magnatica subsolida (d'Orbigny, 1852) (Pl. 23, figs 12–13)

- v*1846 *Natica solida* Sowerby: 255, pl. 3, fig. 41 only (junior primary homonym of *N. solida* Blainville, 1825).
 1852 *Natica subsolida* d'Orb., 1847; d'Orbigny: 39 (*nomen novum*).
 v1854 *Natica Orbignyi* Hupé: 224 (*nomen nudum*).
 v1887 *Natica solida* Sow.; Philippi: 85, pl. 10, fig. 16 (of Sowerby).

TYPE MATERIAL. Sowerby (1846: 255) referred to a single specimen from Navidad (thus the holotype) and several 'possibly distinct' specimens from Santa Cruz. Three specimens are still present in the collection (NHM-G26366, NHM-G26367 and NHM-G26342), all labelled Santa Cruz. The latter specimen belongs to a different genus. While NHM-G26366 (Plate 23, figs 14; fig. 40 of Sowerby) and NHM-G26367 belong to *Glossaulax*, NHM-G26342 (Plate 23, figs 12–13; fig. 41 of Sowerby) is a *Magnatica* Marwick, 1924 (type species *Polinices planispirus* Suter, 1917 = *Natica* (*Magnatica*) *suteri* Marwick, 1924, an unnecessary replacement name). Because no *Magnatica* is known to occur at Santa Cruz while it is common at Navidad, NHM-G26342 is regarded as the figured holotype from Navidad. This specimen agrees well with figure and description of Sowerby (1846: 255), who stated that 'The only specimen is very much worn, particularly about the spire'. The name *Natica solida*, however, is not available due to the existence of a primary homonym and thus the replacement name *Natica subsolida* d'Orbigny, 1852 has to be used (ICZN 1999: Art. 72.7).

TYPE LOCALITY. Navidad, Navidad Formation, Miocene, Central Chile.

Fig. 14 *Glossaulax darwini* (Hutton, 1886), non-type specimen of *Natica solida* Sowerby, 1846 NHM-G26366 (height = 30 mm). **Fig. 15** *Natica pumila* Sowerby, 1846, from pl. 3, fig. 28 of Sowerby. **Figs 16–17** *Penion subreflexus* (Sowerby, 1846). Holotype of *Fusus striatonodosus* Hupé, 1854 MNHN-Gg2002/67 (height = 45.9 mm). **Figs 18–19** *Gemmula* (*Ptychosyrinx*) *subaequalis* (Sowerby, 1846). Holotype NHM-G26344. **Figs 20–23** *Sinum subglobosum* (Sowerby, 1846). **20–21**, Syntype NHM-G26350 (height = 21 mm). **22–23**, Holotype of *Sigaretus elegans* Hupé, 1854 MNHN-Gg2002/79 (height = 17.6 mm).

REMARKS. Sowerby (1846) was not convinced that the material from Santa Cruz was conspecific with that from Navidad ('closely resembling, but possibly distinct from this species'). Sowerby's (1846) fig. 40 is of a specimen from Santa Cruz and fig. 41 from Navidad. They are clearly two different taxa. Fine spiral threads are shown on the NHM photo of the Santa Cruz specimen, although it also appears to be decorticated. Ihering (1907) was also aware of this and identified all the material from Santa Cruz that he had previously placed under *Natica solida* Sowerby as *Polynices santacruzensis*. Sowerby's name had already been substituted by Hutton (1886) for *Natica darwini*. However, Ihering restricted the use of *darwini* to the material from Chile and included the material from Santa Cruz in his new species *P. santacruzensis*. Neither Ihering nor Hutton appear to have been aware of d'Orbigny's (1852: 96) earlier substitution of *solida* by *subsolida*. Therefore, Hutton's introduction of *darwini* for all the material from Navidad and Santa Cruz (plus the specimens from Pareora believed by Hutton himself to be conspecific with the South American material) did nothing to clarify the real taxonomic status of this taxon. Ihering (1907) was right in distinguishing the material from Santa Cruz (including Sowerby's fig. 40) as clearly different. He failed, however, to notice that Sowerby's specimen of *subsolida* from Santa Cruz is different from his type material of *Polynices santacruzensis* Ihering, 1907 (p. 152–154, pl. 5, fig. 15). At the same time, he stated that the name *darwini* should be used for the Chilean material, an unwarranted assumption as the Chilean (and Argentine) material had already been renamed *subsolida* by d'Orbigny. The present situation is that there are two distinct taxa with two available names (*darwini* and *subsolida*). We hereby select the name *subsolida* for the species from Chile (Sowerby's fig. 41), while we believe that *darwini* should be used for the species from Santa Cruz (Sowerby's fig. 40). For the specimens described by Hutton from Pareora, Ihering (1907: 154, pl. 5, fig. 16) proposed the name *P. huttoni*. The callus on Ihering's specimen shows the shallow pit usually present at the junction of the parietal and columellar calluses. The funicle is bordered anteriorly by a conspicuous groove. Philippi gave two figures of what he thought was *Natica solida*, one reproduced from Sowerby (Philippi 1887: pl. 10, fig. 16) and one named *Natica solida?* (Philippi 1887: pl. 10, fig. 18) in the figure captions, which is the large specimen from Lebu mentioned in the text and which probably represents a distinct species. However, Philippi's identification of his two specimens from Navidad (SGO.PI.44) as *Natica solida* is correct.

***striatonodosus* Hupé, 1854 [*Fusus*]**

Penion subreflexus (Sowerby, 1846) (Pl. 23, figs 16–17)

v*1846 *Fusus subreflexus* Sowerby: 259, pl. 4, fig. 57.

v1854 *Fusus striato-nodosus* Hupé: 174, pl. 2, fig. 5.

TYPE MATERIAL. Holotype of *Fusus striato-nodosus* housed in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/67.

TYPE LOCALITY. 'Terreno terciario de Cahuil, provincia de Colchagua' [Tertiary beds of Cahuil, province of Colchagua, Chile, i.e. Navidad Formation of Miocene age]. Catalogue 8P states Topocalma.

REMARKS. See entry under *subreflexus* Sowerby, 1846 [*Fusus*], of which *Fusus striatonodosus* is a synonym.

***striolata* Sowerby, 1846 [*Natica*]**

'*Natica*' *striolata* Sowerby, 1846

*1846 *Natica striolata* Sowerby: 255, pl. 3, fig. 39.

1887 *Natica striolata* Sow.; Philippi: 86, pl. 10, fig. 15 (of Sowerby).

v1972 *Polinices* (s. lat.) *striolata* (Sowerby); Fleming in Watters & Fleming: 402.

1979 *Natica* (*Sigaticus*) *striolata* (Sowerby); Tavera: 94.

v2001 '*Natica*' *striolata* Sowerby, 1846; Frassinetti: 79, figs 6, 7.

TYPE MATERIAL. The two syntypes could not be located in the NHM and must be considered as lost. Since the species cannot be confused with any other occurring in Chile, the designation of a neotype should await a complete revision of the species.

TYPE LOCALITY. Chiloé, eastern coast. Darwin (1846) gives it as Lemuy.

REMARKS. '*Natica*' *striolata* is known basically from Chiloé and surrounding areas. The only record from the Navidad Formation (Tavera, 1979) should be regarded with caution. No other specimen has been collected by other investigators and it is also unknown from the geographically intermediate Ranquil Formation of Arauco. However, it would not be surprising if the occurrence of '*Natica*' *striolata* in the Navidad Formation could be confirmed.

***subaequalis* Sowerby, 1846 [*Pleurotoma*]**

Gemmula (*Ptychosyrinx*) *subaequalis* (Sowerby, 1846)
(Pl. 23, figs 18–19)

v*1846 *Pleurotoma subaequalis* Sowerby: 257, pl. 4, fig. 52.

v2000 *Gemmula subaequalis* (Sowerby, 1846); Frassinetti: 145–147, pl. 2, figs 13–17.

TYPE MATERIAL. Holotype: NHM-G26344.

TYPE LOCALITY. Isla Guafo, Upper Pliocene, Central Chile.

REMARKS. *Pleurotoma subaequalis* comes from the Pliocene of Isla Guafo (Sowerby 1846) as has been confirmed by Frassinetti (2000).

***subglobosus* Sowerby, 1846 [*Sigaretus*]**

Sinum subglobosum (Sowerby, 1846) (Pl. 23,
figs 20–23)

v*1846 *Sigaretus subglobosus* Sowerby: 254, pl. 3, figs 36, 37.

v1854 *Sigaretus elegans* Hupé: 226, pl. 1, fig. 5 (junior primary homonym of *S. elegans* Blainville, 1827).

v1887 *Sigaretus subglobosus* Sow.; Philippi: 86, pl. 9, fig. 19.

v2001 *Sinum subglobosus* (Sowerby, 1846); Frassinetti: 80.

v2007 *Sinum subglobosum* (Sowerby); Finger *et al.*: fig. 12L.

TYPE MATERIAL. Two syntypes of *Sigaretus subglobosus*: NHM-G26350–1 (Navidad); holotype of *Sigaretus elegans*

housed in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/79 (Topocalma).

TYPE LOCALITY. Navidad, Chile, and Ipún (Ypun) Island, Chonos Archipelago. The sediments exposed at Navidad are included in the Navidad Formation, which is late Miocene to early Pliocene according to Finger *et al.* (2007). The sediments from Ipún Island are supposed to be of a similar age (Frassinetti 2004).

REMARKS. *Sinum subglobosum* is well represented in collections from the Navidad Formation, central Chile, to Isla Stokes, southern Chile. It can be easily distinguished from the co-occurring *S. pullum* (Philippi, 1887), which is smaller, basally flattened and has an oblique aperture. *Sinum subglobosum* is an unusually tall, subspherical, thick-shelled species of *Sinum*, and possibly belongs in another genus.

subreflexus Sowerby, 1846 [*Fusus*]

Penion subreflexus (Sowerby, 1846) (Pl. 24, figs 1–2)

- v*1846 *Fusus subreflexus* Sowerby: 259, pl. 4, fig. 57.
- v1854 *Fusus striato-nodosus* Hupé: 174, pl. 2, fig. 5.
- v1887 *Fusus subreflexus* Sow.; Philippi: 41–42, pl. 2, fig. 8.
- v1979 'F.' (*Siphonalia*) *subreflexus* Sow.; Tavera: 87, pl. 17, fig. 50.

TYPE MATERIAL. Lectotype of *Fusus subreflexus*: NHM-G26405 (height 42.9 mm; Plate 24, figs 1–2), paralectotype of *Fusus subreflexus*: NHM-G26406 (Plate 24, figs 3–4); holotype of *Fusus striatonodosus* in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/67 (Topocalma, height 45.9 mm). The syntype NHM-G26406 does not belong in *Penion subreflexus* but rather in *Penion domeykoanus* (Philippi, 1887). Therefore NHM-G26405 is selected here as lectotype for *Fusus subreflexus*.

TYPE LOCALITY. Navidad, Navidad Formation, Miocene, Central Chile. Hupé (1854), as usual, gave Cahuil as type locality while the collection catalogue states Topocalma.

REMARKS. A possible placement in *Penion* had been noted by Ponder (1973). We agree with this, but a full systematic treatment of this species is still wanting.

sulcatus Hupé, 1854 [*Fusus*]

'*Fusus*' *orbignyi* Hupé, 1854

- v*1854 *Fusus sulcatus* Hupé, pl. 3, fig. 5 (junior primary homonym of *F. sulcatus* Lamarck, 1816).

REMARKS. After the plates were printed, Hupé realised that *Fusus sulcatus* was a preoccupied name and replaced it in the text with *Fusus orbignyi*. See entry under *orbignyi* Hupé, 1854 [*Fusus*] herein.

suturalis Sowerby, 1846 [*Turritella*]

'*Turritella*' *pseudosuturalis* d'Orbigny, 1852 (Pl. 24, fig. 9)

- v*1846 *Turritella suturalis* Sowerby: 257, pl. 3, fig. 50 (junior primary homonym of *T. suturalis* Phillips, 1836 and *T. suturalis* Forbes, 1844).
- 1852 *Turritella pseudo-suturalis* d'Orb., 1847; d'Orbigny: 33 (*nomen novum*).

- v1887 *Turritella ambulacrum* Sow.; Philippi: 71, pl. 9, figs 1, 1a (*non* Sowerby, 1846).

- 1887 *Turritella sowerbyana* Philippi: 71, pl. 9, fig. 2 (*nomen novum*).

- ?1887 *Turritella patagonica* Sow.; Philippi: 72 (*non* Sowerby, 1846).

TYPE MATERIAL. Two syntypes: NHM-G26357; NHM-G26358 (Navidad).

TYPE LOCALITY. Navidad, Chile and Ipún (Ypun) Island, Chonos Archipelago. The sediments exposed at Navidad are included in the Navidad Formation, which is late Miocene to early Pliocene according to Finger *et al.* (2007). The sediments from Ipún Island are supposed to be of a similar age (Frassinetti 2004).

REMARKS. *Turritella ambulacrum* Sowerby, 1846 had been originally described from Patagonia and is different from *T. suturalis*, coming from Navidad. *Turritella suturalis* is a several times preoccupied name and was therefore renamed as *T. pseudosuturalis* by d'Orbigny (1852). Philippi (1887) subsequently introduced the replacement name *T. sowerbyana*, apparently not being aware of the name of d'Orbigny. *Turritella pseudosuturalis* is considered not to belong in *Incitella* DeVries, 2007 (DeVries, pers. comm. 2006).

triplicata Sowerby, 1846 [*Voluta*]

Palaeomelon jeffi new name (Pl. 24, figs 5–8)

- v*1846 *Voluta triplicata* Sowerby: 262, pl. 4, fig. 74 (junior primary homonym of *V. triplicata* Donovan, 1802).
- v1887 *Voluta triplicata* Sow.; Philippi: 66, pl. 7, figs 8–10.
- 1907 *Adelomelon triplicata* (Sowerby, 1846); Dall: 365.
- 1907 *Proscaphella triplicata* Sow.; Ihering: 206.
- v1975 *Proscaphella triplicata* (Sowerby, 1846); Stuardo & Villarroel: 152–153, fig. 19.
- v2006 *Miomelon triplicata* (Sowerby, 1846); del Río & Martínez, figs 14.3, 14.4.
- v2007 *Palaeomelon triplicata* (Sowerby, 1846); Nielsen & Frassinetti: 86, figs. 5.1–5.8.

TYPE MATERIAL. There are two syntypes: NHM-G26412 and NHM-G26413.

TYPE LOCALITY. Navidad, Navidad Formation, Miocene, Central Chile.

REMARKS. The figured syntype NHM-G26412 (Sowerby 1846: pl. 4, fig. 74) has three narrow, sharp columellar plaits; many fine, even spiral threads all over; a weak keel at the periphery; quite prominent axial folds all over, commencing halfway down the base; protoconch with a 'caricelloid' spine. The other syntype (NHM-G26413) has weaker spiral threads and more prominent axials, a more deeply concave sutural ramp than the figured one and it lacks a keel at the periphery. The two specimens may not be conspecific. Del Río & Martínez (2006) figured the syntype NHM-G46412, calling it holotype in the figure captions. This, however, does not serve as a valid lectotype designation. The Chilean species of the genus *Proscaphella* Ihering, 1907 have been revised by Stuardo & Villarroel (1975). The type species of *Proscaphella*, *Voluta gracilis* Philippi, 1887 (i.e. *Voluta gracilior* Ihering, 1896), belongs in *Miomelon* Dall, 1907 (type species *Volutilithes philippiana* Dall, 1890), which makes

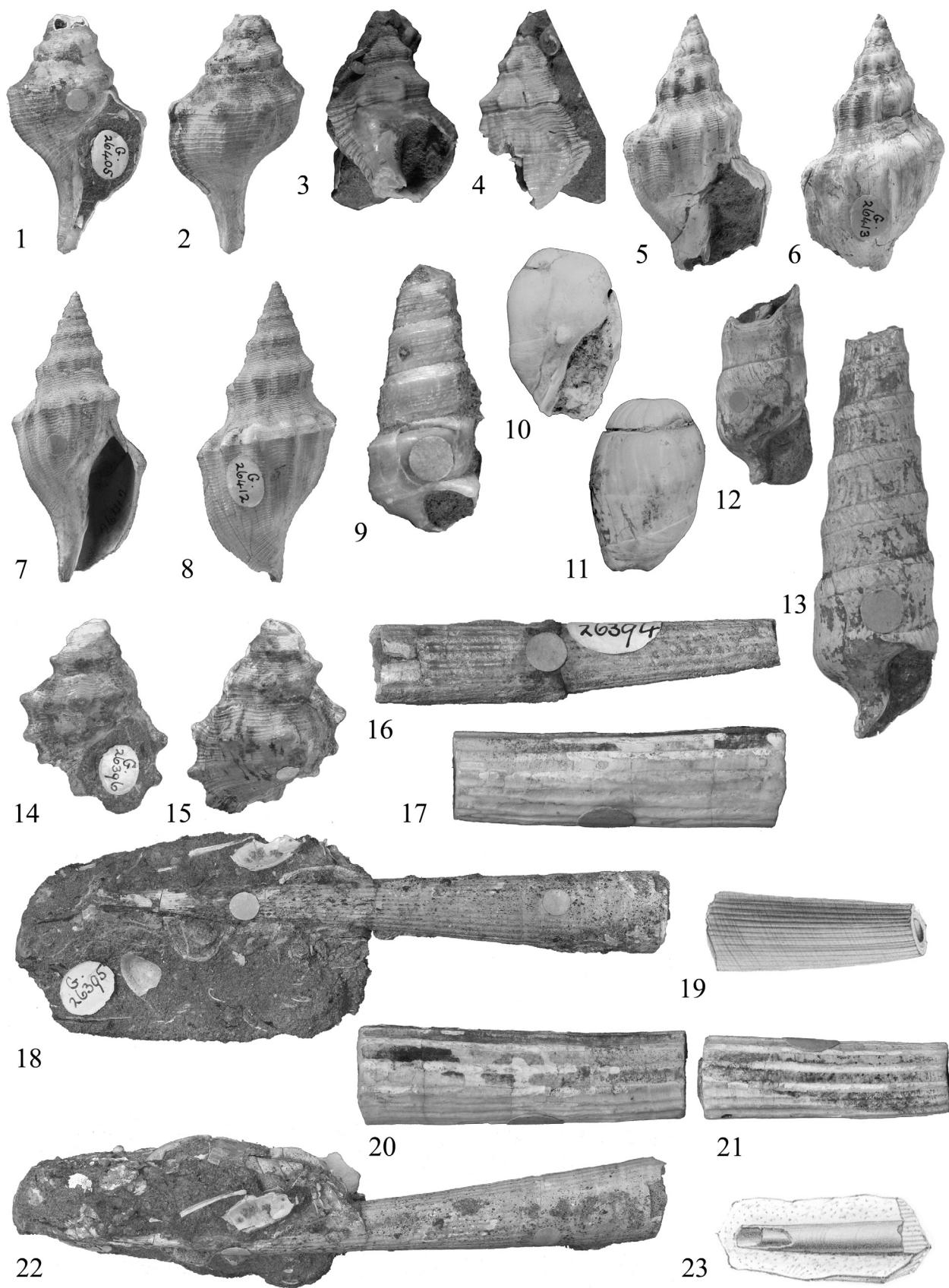


Plate 24 **Figs 1–2** *Penion subreflexus* (Sowerby, 1846), lectotype NHM-G26405 (height = 42.9 mm). **Figs 3–4** *Penion domeykoanus* (Philippi, 1887), paralectotype of *Penion subreflexus* (Sowerby, 1846) NHM-G26406 (height = 36 mm). **Figs 5–8** *Palaeomelon jeffi* new name. **5–6**, Syntype NHM-G26413 (height = 46.4 mm). **7–8**, Syntype NHM-G26412 (height = 53.9 mm). **Fig. 9** *Turritella pseudosuturalis* (d'Orbigny, 1852), syntype NHM-G26357 (height = 24.2 mm). **Figs 10–11** *Olivancillaria claneophila* (Duclos, 1835), holotype of *Oliva tumorifera* Hupé, 1854 MNHN-Gg2002/75 (height = 31.4 mm). **Figs 12–13** *Terebra undulifera* Sowerby, 1846). **12**, Syntype NHM-G26339 (height = 36.3 mm). **13**,

Proscaphella a synonym of *Miomelon*. However, contrary to del Río & Martínez (2006), *Voluta triplicata* does not belong there and the new genus *Palaeomelon* was introduced by Nielsen & Frassinetti (2007) to accommodate this and related Chilean Neogene volutes.

After Nielsen & Frassinetti (2007) went to the printer we discovered homonymy with *Voluta triplicata* Donovan, 1802, a synonym of *Tralia ovula* (Bruguière, 1789) (see de Frias Martins 1996), and we propose *Palaeomelon jeffi* as replacement name for *Voluta triplicata* Sowerby, 1846. This name is in honour of our friend and colleague Jeffrey (Jeff) Stilwell who contributed much to our knowledge of Southern Hemisphere fossil molluscs.

tuberculifera Hupé, 1854 [*Cassidaria*]

Echinophoria monilifera (Sowerby, 1846) (pl. 21, figs 17–20)

v*1846 *Cassis monilifer* Sowerby: 260–261, pl. 4, fig. 65.

v1854 *Cassidaria tuberculifera* Hupé: 209, pl. 3, fig. 2.

TYPE MATERIAL. Two syntypes of *Cassidaria tuberculifera* in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/52.

TYPE LOCALITY. Hupé (1854: 209) stated Coquimbo as the type locality for this species, but Catalogue 8P reads Cucao, which is consistent with our own observations that confirm that no cassids occur in Coquimbo, while this species is common in Cucao.

REMARKS. This is a junior synonym of *Echinophoria monilifera* (Sowerby). See entry under *monilifer* Sowerby, 1846 [*Cassis*] herein for further comments.

tumorifera Hupé, 1854 [*Oliva*]

Olivancillaria claneophila (Duclos, 1835) (Pl. 24, figs 10–11)

v*1835 *Oliva claneophila* Duclos, pl. 29, figs 8, 9.

v1845 *Oliva claneophila* Duclos; Duclos: 31, pl. 31, figs 8, 9.

v1854 *Oliva tumorifera* Hupé: 217–218, pl. 3, fig. 8.

v1887 *Oliva tumorifera* Hupé; Philippi: 68, pl. 8, fig. 9.

v1887 *Oliva pyriformis* Philippi: 73, pl. 8, fig. 11.

v1887 *Oliva lebuensis* Philippi: 73, pl. 8, fig. 13.

v1887 *Oliva otaeguii* Philippi: 74, pl. 8, fig. 21.

1896 *Ancillaria tumorifera* Hup. sp.; Möricke: 572.

1907 *O. tumorifera* Phil.; Ihering: 514.

1966 *O. claneophila*; Klappenbach: 77.

v1972 *Olivancillaria (Lintricula) tumorifera* (Hupé); Fleming in Watters & Fleming: 398, figs 6 t, w.

v1979 *Olivancillaria tumorifera* (Hupé, 1854); Tavera: 90, pl. 16, fig. 43.

v2004 *Olivancillaria claneophila* (Duclos, 1835); Nielsen: 89, figs 2–7, 14–18.

v2007 *Olivancillaria claneophila* (Duclos); Finger *et al.*: fig. 12G.

TYPE MATERIAL. Holotype of *Oliva claneophila* housed unnumbered in the MNHN-BIMM, labelled Navidad; holotype of *Oliva tumorifera* housed in the Typothèque of the Laboratoire de Géologie under number MNHN-Gg2002/75.

TYPE LOCALITY. ‘Fossile du Chili (...) il appartient au terrain tertiaire recouvrant le granit de la Trinidad, canton de la Navidad, et ne se rencontre que sur les escarpements des bords de la mer.’ (Duclos 1846: 31) [From the coast near Navidad, Chile]. According to Hupé (1854), the type of *Oliva tumorifera* comes from ‘cerca de Cucao’ [near Cucao], i.e. Chiloé while the catalogue states Topocalma as type locality. However, the species occurs at both localities and the type locality is that of Duclos’ species.

REMARKS. *Olivancillaria claneophila* is known from the earliest to late Miocene of southern Peru (DeVries & Frassinetti 2003) to Chiloé, southern Chile (Fleming in Watters & Fleming 1972; our unpublished data). This species has been revised recently by Nielsen (2004) and the reader is referred there for a more complete discussion. However, contrary to the date given in Nielsen (2004) the page and plate of Duclos in Chenu were published in 1845 as listed by Sherborn & Smith (1911).

turbinelloides Sowerby, 1846 [*Pleurotoma*]

Austrotoma echinulata (Hupé, 1854) (Pl. 20, figs 24–25)

v*1846 *Pleurotoma turbinelloides* Sowerby: 258, pl. 4, fig. 53 (junior primary homonym of *P. turbinelloides* Reeve, 1846).

TYPE MATERIAL. Holotype of *Pleurotoma turbinelloides*: NHM-G26398 (Navidad).

TYPE LOCALITY. Navidad, Chile.

REMARKS. This is a senior synonym of *Austrotoma echinulata* (Hupé, 1854) but at the same time a junior primary homonym of *Pleurotoma turbinelloides* Reeve, 1846. See entry under *echinulatus* Hupé, 1854 [*Fusus*].

undulifera Sowerby, 1846 [*Terebra*]

Terebra undulifera Sowerby, 1846 (Pl. 24, figs 12–13)

v*1846 *Terebra undulifera* Sowerby: 262, pl. 4, figs 72, 73.

v1887 *Terebra undulifera* Sow.; Philippi: 63, pl. 7, fig. 2.

v2007 *Terebra undulifera* Sowerby; Finger *et al.*: fig. 12I.

TYPE MATERIAL. Two syntypes NHM-G26339 (height = 36.3 mm), NHM-G26340 (height = 37.2 mm) (both Navidad), both figured.

TYPE LOCALITY. Navidad, Navidad Formation, Miocene, Central Chile.

REMARKS. Syntype NHM-G26339 is the short fragment, ca. 18 mm diameter. Syntype NHM-G26340 is the slightly taller and much more complete specimen. The former is a poor specimen with a worn surface. The latter shows a wide, low subsutural cord, followed below by a narrow groove

Syntype NHM-G26340 (height = 37.2 mm). **Figs 14–15** *Ameranella verruculosa* (Sowerby, 1846), holotype NHM-G26396 (height = 34.3 mm).

Fig. 16 *Fissidentalium? majus* (Sowerby, 1846), holotype NHM-G26394 (length = 39.3 mm). **Figs 17, 20, 21** ‘*Dentalium*’ *sulcosum* Sowerby, 1846, holotype NHM-G26402. **17, 20**, larger piece (length 22.5 mm). **21**, Shorter piece (length = 17 mm). **Figs 18, 22** *Fissidentalium subgiganteum* (d’Orbigny, 1852), holotype NHM-G26395 (length = 82 mm, with attached sediment length = 92.3 mm). **Fig. 19** ‘*Dentalium*’ *corrugatum* Hupé, 1854, from plate 2, fig. 8 of Hupé. **Fig. 23** ‘*Dentalium*’ *intermedium* Hupé, 1854, from plate 2, fig. 9 of Hupé.

and then by a wide, shallowly concave area with prominent, arcuate growth lines. *Terebra undulifera* is well represented in collections from Navidad to Chiloé.

verruculosus Sowerby, 1846 [Triton]

Ameranella verruculosa (Sowerby, 1846) (Pl. 24, figs 14–15)

- v*1846 *Triton verruculosus* Sowerby: 260, pl. 4, fig. 63.
 v1887 *Tritonium verruculosum* Sow.; Philippi: 53 (*partim*, non pl. 4, fig. 10).
 v1887 *Tritonium exiguum* Philippi: 54, pl. 3, fig. 23 (*partim*).
 v1979 '*Tritonium*' (*Ranella*?) *verruculosum* Sow.; Tavera: 90, pl. 19, figs 67a, b.
 v1988 *Ameranella verruculosa* (Sowerby, 1846); Beu: 83–84, pl. 3, figs 1–4, 6, 7.

TYPE MATERIAL. Holotype: NHM-G26396 (Navidad).

TYPE LOCALITY. Navidad, Navidad Formation, Miocene, Central Chile.

REMARKS. This species has been discussed in detail by Beu (1988) and we refer the reader there for further taxonomic information.

Scaphopoda

corrugatus Hupé, 1854 [Dentalium]

'*Dentalium*' *corrugatum* Hupé, 1854 (Pl. 24, fig. 19)

- *1854 *Dentalium corrugatus* Hupé: 276, pl. 2, fig. 8.

TYPE MATERIAL. The type material is mentioned in Catalogue 8P under number 201. However, we were not able to find this material in the Gay collection of the MNHN-LG.

TYPE LOCALITY. "Terrenos terciarios de la costa de Topocalma, en la provincia de Colchagua" [Tertiary beds on the coast of Topocalma, province of Colchagua].

REMARKS. It is unclear if the type material still exists. Judging from Hupé's original figure, *Dentalium corrugatum* Hupé, 1854 seems to be a synonym of *D. giganteum* Sowerby, 1846 (i.e. *D. subgiganteum* d'Orbigny, 1852) but if the type material is lost, selection of a neotype should await a systematic revision of all the Chilean Neogene scaphopods.

giganteum Sowerby, 1846 [Dentalium]

Fissidentalium subgiganteum (d'Orbigny, 1852) (Pl. 24, figs 18, 22)

- v*1846 *Dentalium giganteum* Sowerby: 263, pl. 2, fig. 1 (junior primary homonym of *D. giganteum* Phillips, 1829 and *D. giganteum* Zenker, 1836).
 1852 *Dentalium subgiganteum* d'Orb., 1847; d'Orbigny: 94.
 1985 *Dentalium sulcosum* Sow. var. *mayus*. Sow.; Tavera *et al.*: pl. 3, fig. 24.

TYPE MATERIAL. Holotype of *Dentalium giganteum*: NHM-G26395 (Navidad).

TYPE LOCALITY. Navidad, Navidad Formation, Miocene, Central Chile.

REMARKS. This species is common from Navidad to Chiloé. A composite of three specimens from own collections reaches a total length of at least 15 cm. The holotype shows remains of the deep apical lobe typical of *Fissidentalium* Fischer, 1885 (type species *Dentalium capillosum* Jeffreys, 1877). Steiner & Kabat (2004) cited J. de C. Sowerby as author of this species, which is a mistake.

intermedium Hupé, 1854 [Dentalium]

'*Dentalium*' *intermedium* Hupé, 1854 (Pl. 24, fig. 23)

- *1854 *Dentalium intermedium* Hupé: 276, pl. 2, fig. 9.

TYPE MATERIAL. This species is not listed in Catalogue 8P and we did not find any possible syntypes in the collection.

TYPE LOCALITY. 'Terrenos terciarios de la costa de Topocalma, en la provincia de Colchagua' [Tertiary beds on the coast of Topocalma, province of Colchagua].

REMARKS. The type material is unknown and the figure does not show whether it is a smooth species or if the figured specimen is an internal mold. We regard *Dentalium intermedium* as a *nomen dubium*.

majus Sowerby, 1846 [Dentalium]

Fissidentalium? *majus* (Sowerby, 1846) (Pl. 24, fig. 16)

- v*1846 *Dentalium majus* Sowerby: 263, pl. 2, fig. 3.

TYPE MATERIAL. Holotype: NHM-G26394.

TYPE LOCALITY. Isla Guafo, Pliocene, southern Chile.

REMARKS. The deposits of Isla Guafo (formerly Huafo) are generally interpreted as being Late Pliocene in age (Frassinetti 1997, 2000). Frassinetti (1997, 2000) revised the bivalves and the gastropods, but not the rest of the fauna. *Fissidentalium majus* is very similar to *F. subgiganteum* and may be closely related. Steiner & Kabat (2004) cited J. de C. Sowerby as author of this species, which is a mistake.

sulcosum Sowerby, 1846 [Dentalium]

'*Dentalium*' *sulcosum* Sowerby, 1846 (Pl. 24, figs 17, 20, 21)

- v*1846 *Dentalium sulcosum* Sowerby: 263, pl. 2, fig. 2.

TYPE MATERIAL. Holotype in two pieces: NHM-G26402.

TYPE LOCALITY. Navidad, Navidad Formation, Miocene, Central Chile.

REMARKS. This species apparently occurs in the siltstones and not in the sandstones of the Navidad Formation. As Sowerby (1846: 263) pointed out, it has 14 rather strong longitudinal ribs and through this can easily be recognised. Steiner & Kabat (2004) stated that this species is a synonym of *Dentalium majus* Sowerby, 1846 (see above) due to first reviser action of Ortmann (1902). However, these two species are clearly not the same. Steiner & Kabat (2004) cited J. de C. Sowerby as author of this species, which is a mistake.

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